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HANDBOOK OF INSTRUCTIONS FOR CR-17 FOUR BAND COLLECTION RECEIVER

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SECTION I

GENERAL DESCRIPTION

1. INTRODUCTION

This handbook provides instructions for the installation, operation, and maintenance of the CR-17 FOUR BAND COLLECTION RECEIVER which is a completely transistorized equipment. The theory of operation for each unit is described and a list of replaceable parts is given.

2. PURPOSE OF EQUIPMENT

The purpose of the CR-17 FOUR BAND COLLECTION RECEIVER is to provide a receiver capable of [redacted] STAT [redacted] STAT The single receiver performs the function of four fixed tuned receivers. A signal-operated relay is included in the unit to activate auxiliary equipment in the presence of signals which exceed a preset threshold level.

3. DESCRIPTION OF COMPONENTS

The CR-17 FOUR BAND COLLECTION RECEIVER consists of plug in units which are mounted on a single 7-1/2 by 17 inch panel. (See Figure 1-1). Adaptors are supplied for mounting the equipment in a standard 19 inch relay rack. The broad-band RF preamplifier, RF channel amplifiers, video amplifiers,

and the combining unit are printed circuit assemblies each with its own chassis. The voltage regulator is conventionally wired in a small chassis and the channel filters employ a cascade of coaxial, helical resonators which are machined in aluminum chassis. Each of the units can be removed from the main panel by removing either two or four screws. (See Figure 1-2 through 1-7.)

4. REFERENCE DATA

a. Nomenclature: CR-17 FOUR BAND COLLECTION RECEIVER

b. Number of packages per complete equipment: 1

c. Over-all dimensions (excluding connectors):
3-1/2 x 7-1/2 x 17 inches.

d. Total volume: 0.6 cu. ft.

e. Total weight: 14.5 pounds

f. Frequency band: [redacted] STAT

g. Video output: 0.2 to 4 volts

h. Power requirements: 24 to 30 volts dc, 0.180 amperes.

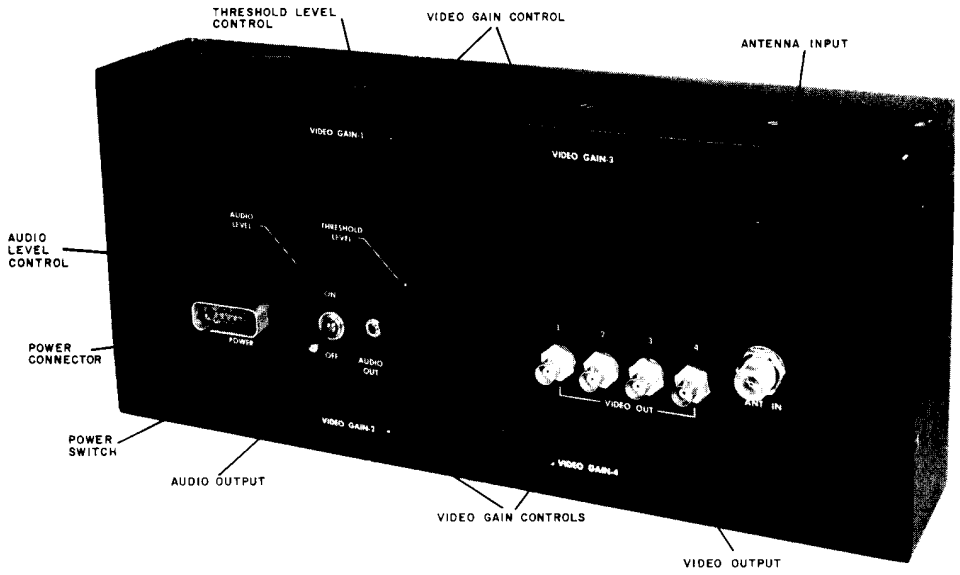
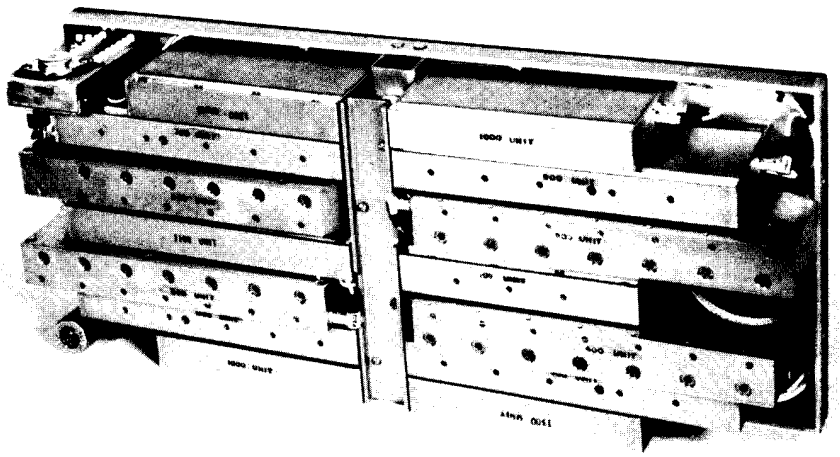


FIGURE 3-1. CR-17 FOUR BAND COLLECTION RECEIVER, FRONT PANEL CONTROLS



REAR VIEW, DUST COVER REMOVED

FIGURE 1-1. CR-17 FOUR BAND COLLECTION RECEIVER

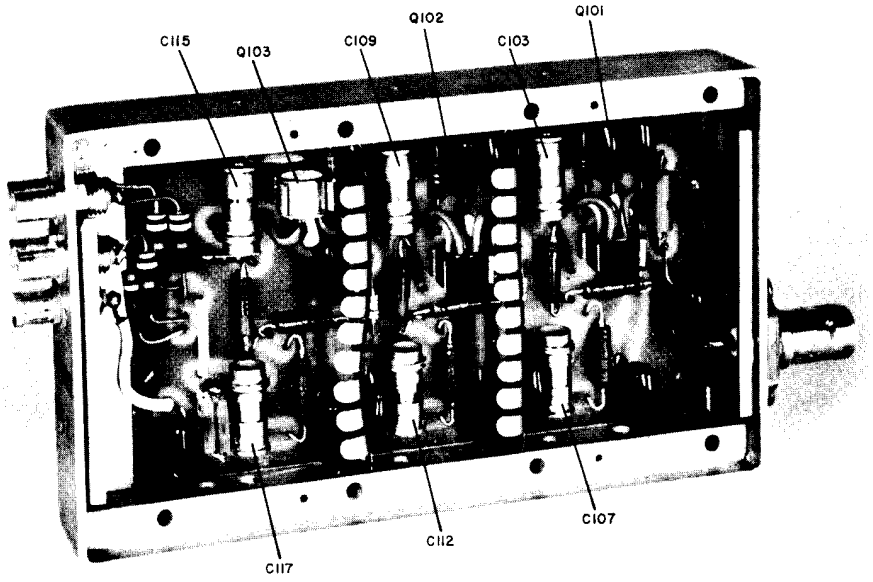


FIGURE 1-2. BROADBAND RF PREAMPLIFIER, 100 UNIT, COVERS REMOVED

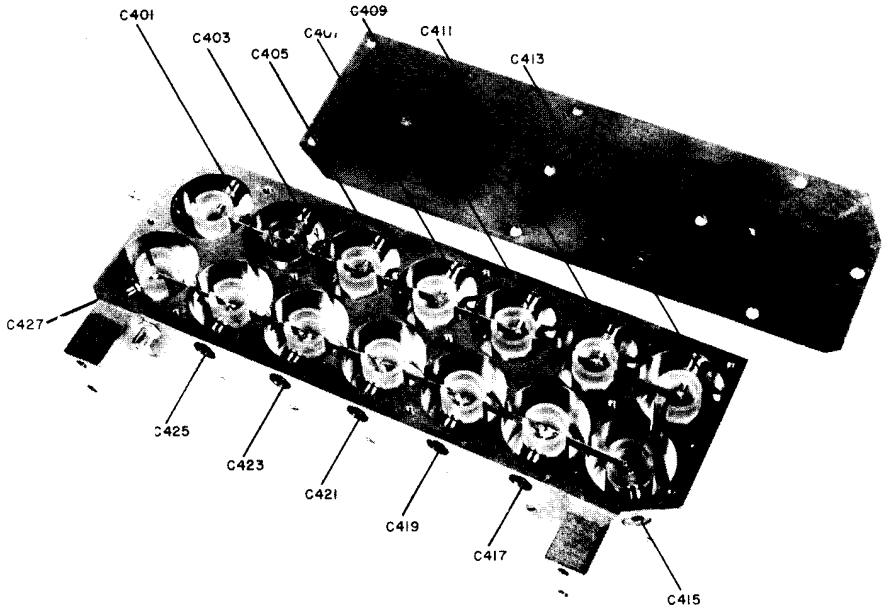


FIGURE 1-3. RF CHANNEL FILTER, 400 UNIT, COVER REMOVED

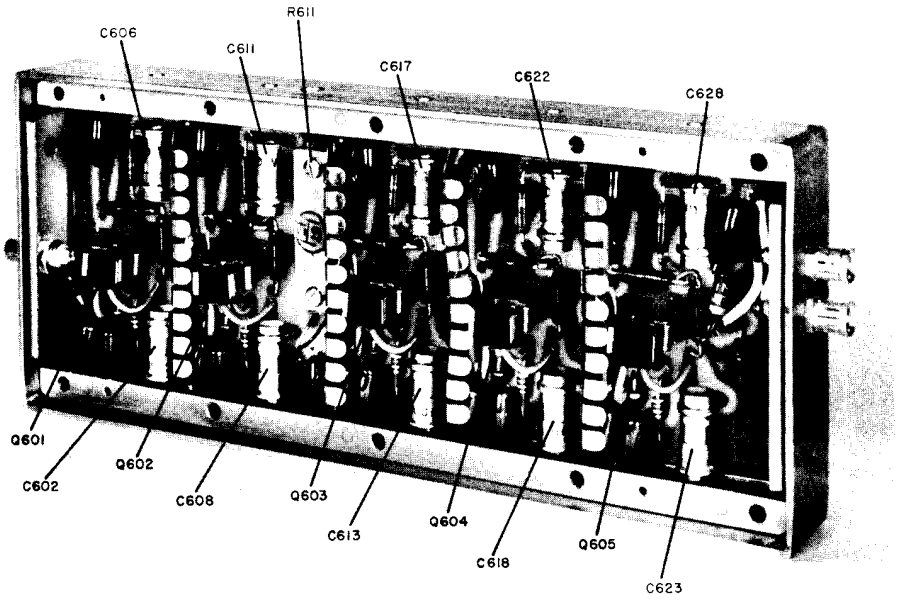


FIGURE 1-4. RF CHANNEL AMPLIFIER, 600 UNIT, COVERS REMOVED

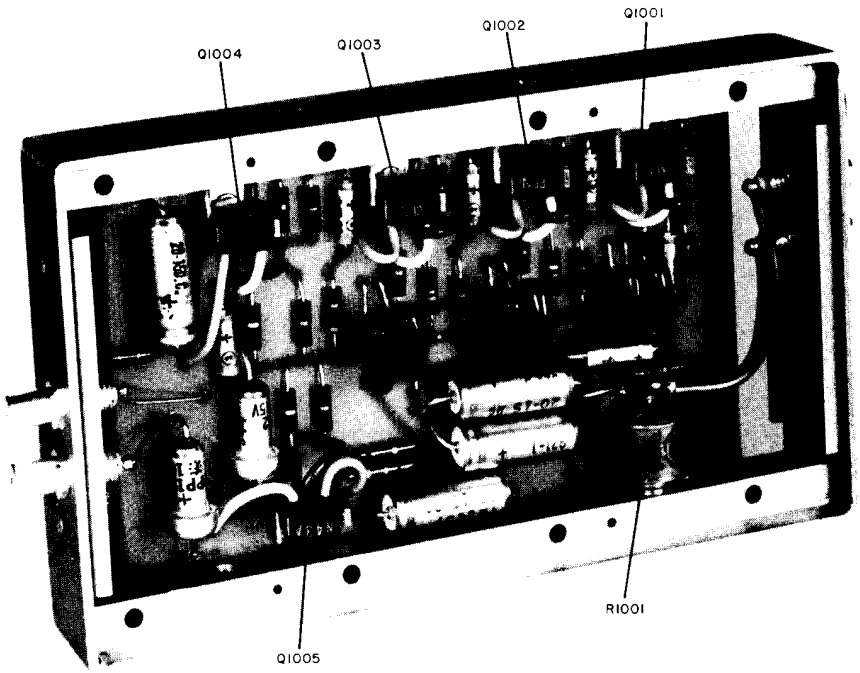


FIGURE 1-5. VIDEO AMPLIFIER, 1000 UNIT, COVERS REMOVED

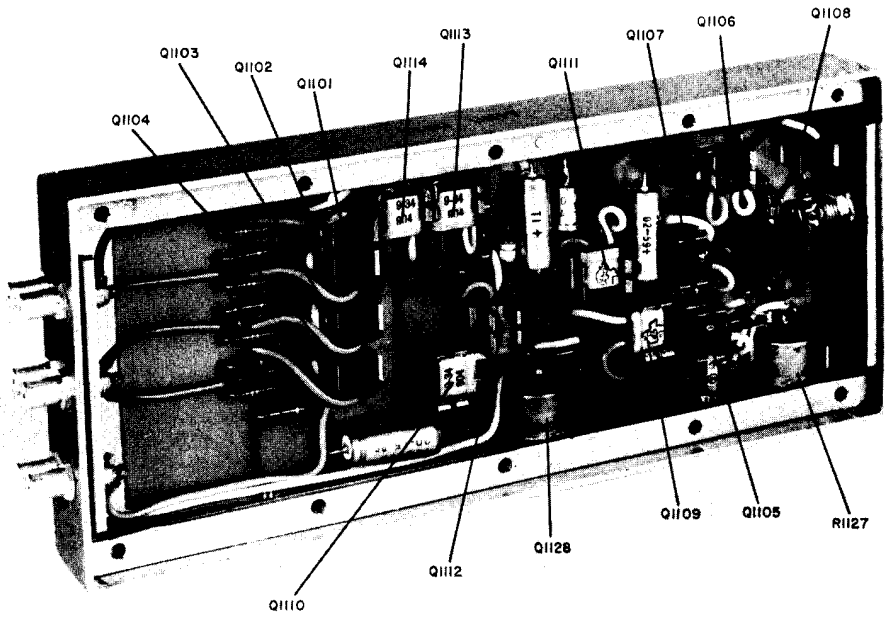


FIGURE 1-6. COMBINING UNIT, 1100 UNIT, COVERS REMOVED

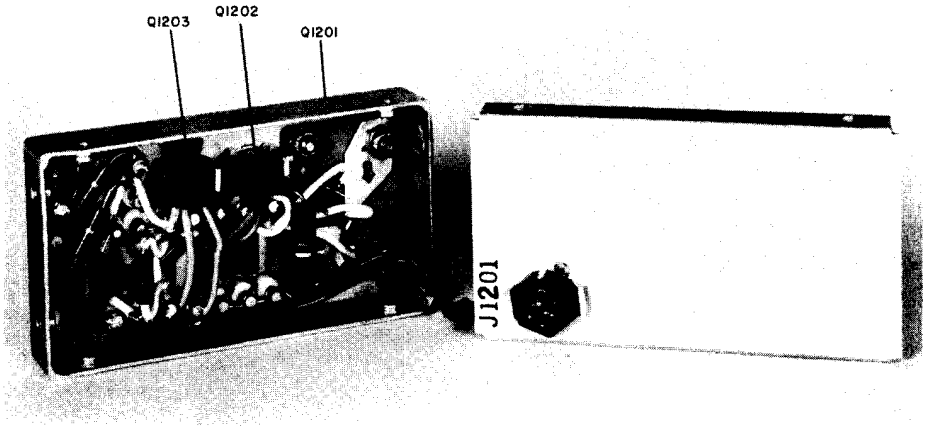


FIGURE 1-7. VOLTAGE REGULATOR, 1200 UNIT, COVER REMOVED

SECTION II

THEORY OF OPERATION

1. GENERAL DESCRIPTION

The CR-17 FOUR BAND COLLECTION RECEIVER is designed to [redacted] STAT STAT Figure 2-1 is a block diagram of the system illustrating the principle of operation.

The front end of the receiver consists of a broadband amplifier covering the entire signal band [redacted] STAT STAT The noise figure of the overall receiver, which is primarily determined by the front end only, measures less than 12 db over the entire passband. After amplification, a resistive multicoupler network is used to provide four isolated RF outputs. Each RF output is then separately processed in a channel consisting of a filter, an RF Amplifier and detector, and a video amplifier. A secondary output from each video amplifier is fed to a combining unit which includes a threshold circuit, a signal-operated relay, and circuitry to provide a stretched audio output to the front panel. The CR-17 FOUR BAND COLLECTION RECEIVER also contains a voltage regulator which provides a nominal dc output of 22 volts for any input from 24 to 30 volts dc. The regulator is very conservatively rated at 250 milliamps.

2. FUNCTIONAL OPERATION OF COMPONENTS

The CR-17 FOUR BAND COLLECTION RECEIVER consists of the following units: (a) Broadband RF Preamplifier (100 unit); (b) RF Channel Filters (200 through 500 units); (c) RF Channel Amplifiers (600 through 900 units); (d) Video Amplifiers (1000 and 1300 units); (e) Combining Unit (1100 unit), and (f) Voltage Regulator (1200 unit).

a. Broadband RF Preamplifier - 100 Unit

The Broadband RF Preamplifier (Figure 2-2) contains three stages of RF amplification (Q101 through Q103) and a resistive multicoupler having four outputs (J103 through J106) isolated from each other by about 12 db.

RF amplification of 30 db is achieved through the cascade of three synchronous double tuned stages which produces a passband that is flat within $\pm \frac{1}{2}$ db from 57 to 78 megacycles.

The third stage of the amplifier feeds the multicoupler which presents a loss of 10 db to the RF signals. The net RF gain of this unit is therefore about 20 db.

b. RF Channel Filters (200 through 500 Units)

The RF channel filters (Figures 2-3 through 2-6) each contain fourteen coaxial, helical resonators. Each resonator coil is wound on a rexolite form and mounted in a cylindrical housing which is machined in the aluminum chassis. The resonators are coupled by means of small "Stripline" capacitors.

Use of these coaxial, helical resonators allows the relization of filters having bandwidths of 4 Mc and skirt attenuations of 40 db one megacycle outside the 3 db points.

The RF channel filters are aligned to [redacted] STAT [redacted] STAT (see Figure 2-7).

c. RF Channel Amplifiers (600 through 900 Units)

The RF channel amplifiers (Figures 2-8 through 2-11) contain five synchronous double tuned stages and a detector. The amplifier bandwidths are between 4.5 and 5 megacycles and overall gains are 55 db. A gain control is provided in the amplifier to permit balancing of the channel gains during the initial alignment procedure.

The RF channel amplifiers are compressive amplifiers and are arranged such that their output signal range is about 26 db for a 70 db signal range into the receiver.

d. Video Amplifiers (1000 and 1300 Units)

The video amplifiers (Figure 2-12) receive detected output signals from the RF channel amplifiers and amplify them to a level suitable for observation at the four front panel outputs. Video output levels are adjustable by means of a gain control which is accessible from the front panel.

The first three stages of the video amplifiers are common emitter configurations which employ RC peaking circuits in their emitters to provide a 500 Kc bandwidth. The succeeding

two stages are emitter followers which isolate the two video outputs from each other and prevent external signals from feeding back into the receiver. One video output is connected to the corresponding front panel jack and the second connects to the combining unit.

e. Combining Unit (1100 Unit)

The combining unit (Figure 2-13) receives inputs from the four video amplifiers and combines them through four emitter followers Q1101 through Q1104 having a common emitter resistor. This common emitter resistor is variable and provides the means of selecting the desired threshold level. The signal from the threshold potentiometer, R1127, is then amplified and differentiated to derive a positive pulse of sufficient amplitude to trigger the pulse stretching multivibrator, Q1106 and Q1107.

The pulse stretched signal is then passed through a chain of three emitter followers which deliver a pulse stretched audio signal to the front panel output jack. An AUDIO LEVEL control, R1128 is included to permit selection of output levels up to 1 volt across 50 ohms. The audio output is independent of RF signal amplitude.

Emitter follower Q1108 also drives the relay triggering and holding circuitry comprised of transistors Q1111 through Q1114. The positive pulses from Q1108 are coupled to Q1111 through diode CR1102. Transistor Q1111 is cut off in the

absence of signals. When a signal is present, Q1111 conducts thereby charging capacitor C1110. The charge on C1110 is sampled by transistor Q1112 through diode CR1103. Transistor Q1112 conducts in the absence of signals and is cut off when C1110 is charged. Cutting off Q1112 removes the base current from Q1113 causing its collector voltage to rise towards 22 volts. This causes Q1114 to conduct thereby closing relay K1. Relay K1 remains closed until C1110 discharges allowing Q1112 to conduct. The discharge time of C1110 is primarily determined by R1137 since diodes CR1102 and CR1103 and transistor Q1111 are all back biased in the presence of charge on this capacitor. This holding time is set at about 2 seconds.

f. Voltage Regulator (1200 Unit)

The voltage regulator (Figure 2-14) is designed to deliver a regulated output of +22 volts dc at 250 ma. for inputs ranging between 24 and 30 volts dc. The unit contains a series transistor, Q1201, and two control transistors, Q1202 and Q1203. Should the regulated output voltage tend to change, the control transistors, Q1202 and Q1203 sense the variation and produce a change at the base of Q1201 thereby returning the output voltage to its nominal value.

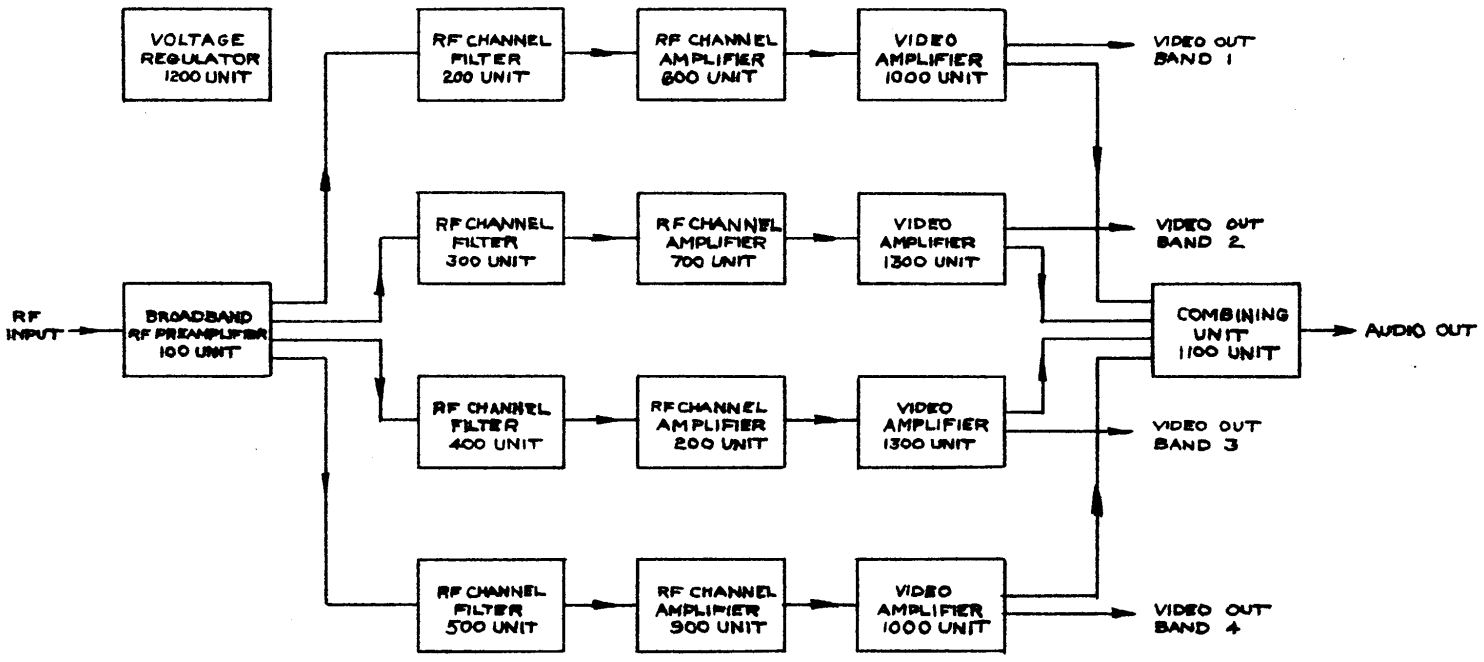


FIGURE 2-1. SYSTEM BLOCK DIAGRAM

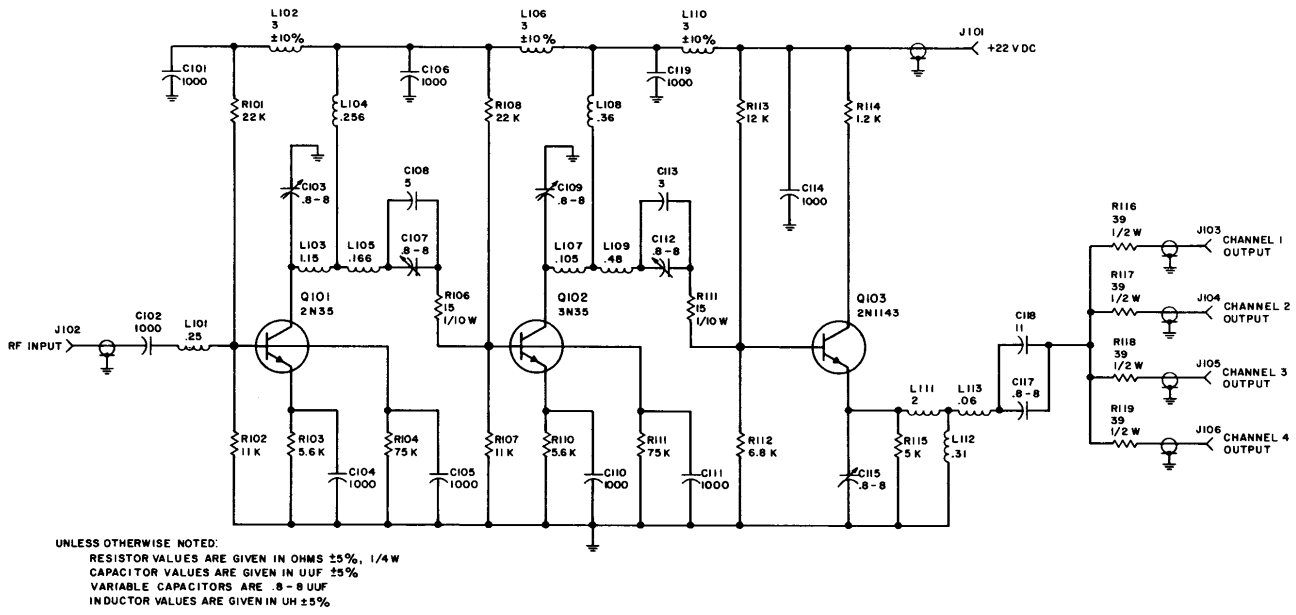
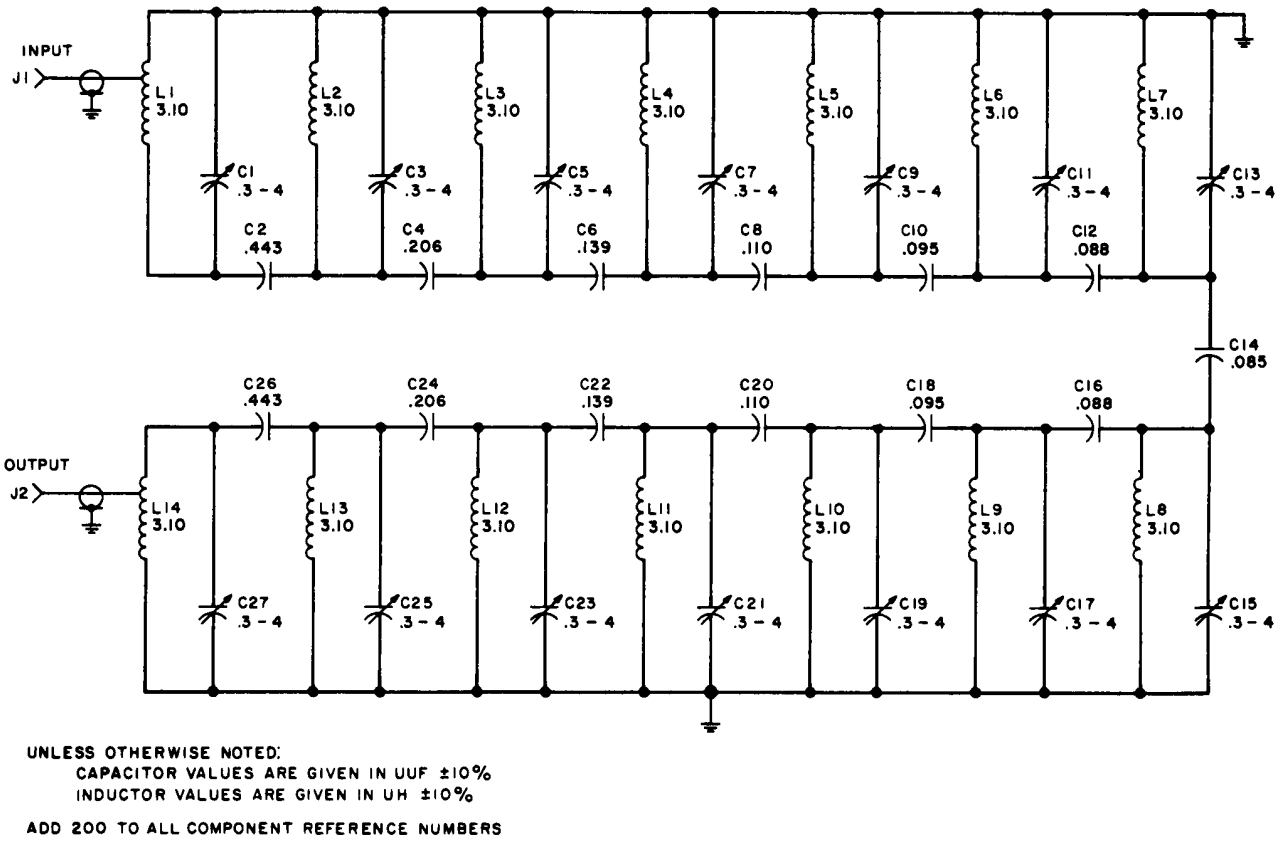


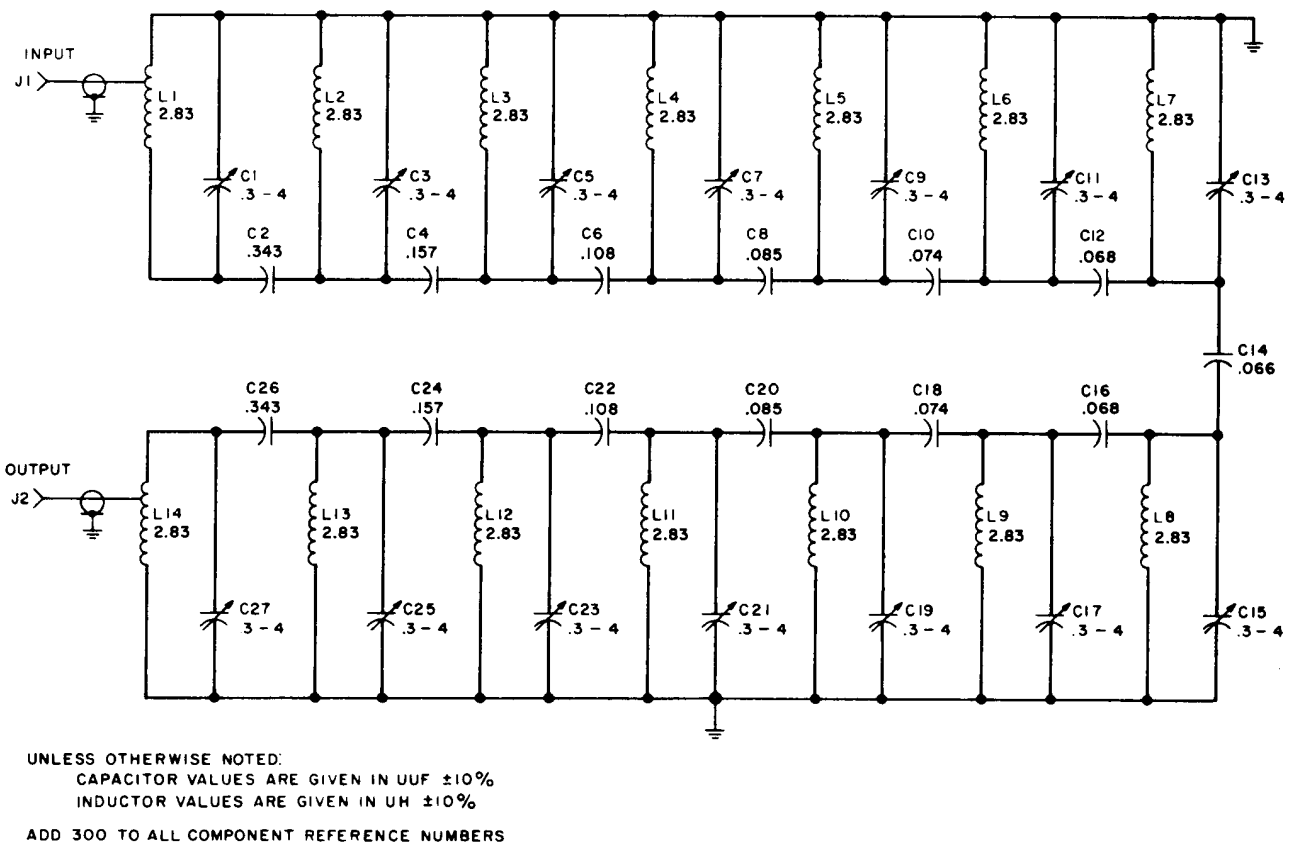
FIGURE 2-2. BROADBAND RF PREAMPLIFIER, 100 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED:
CAPACITOR VALUES ARE GIVEN IN UUF ±10%
INDUCTOR VALUES ARE GIVEN IN UH ±10%

ADD 200 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-3. RF CHANNEL FILTER, 200 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED:
CAPACITOR VALUES ARE GIVEN IN UUF ±10%
INDUCTOR VALUES ARE GIVEN IN UH ±10%

ADD 300 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-4. RF CHANNEL FILTER, 300 UNIT, SCHEMATIC DIAGRAM

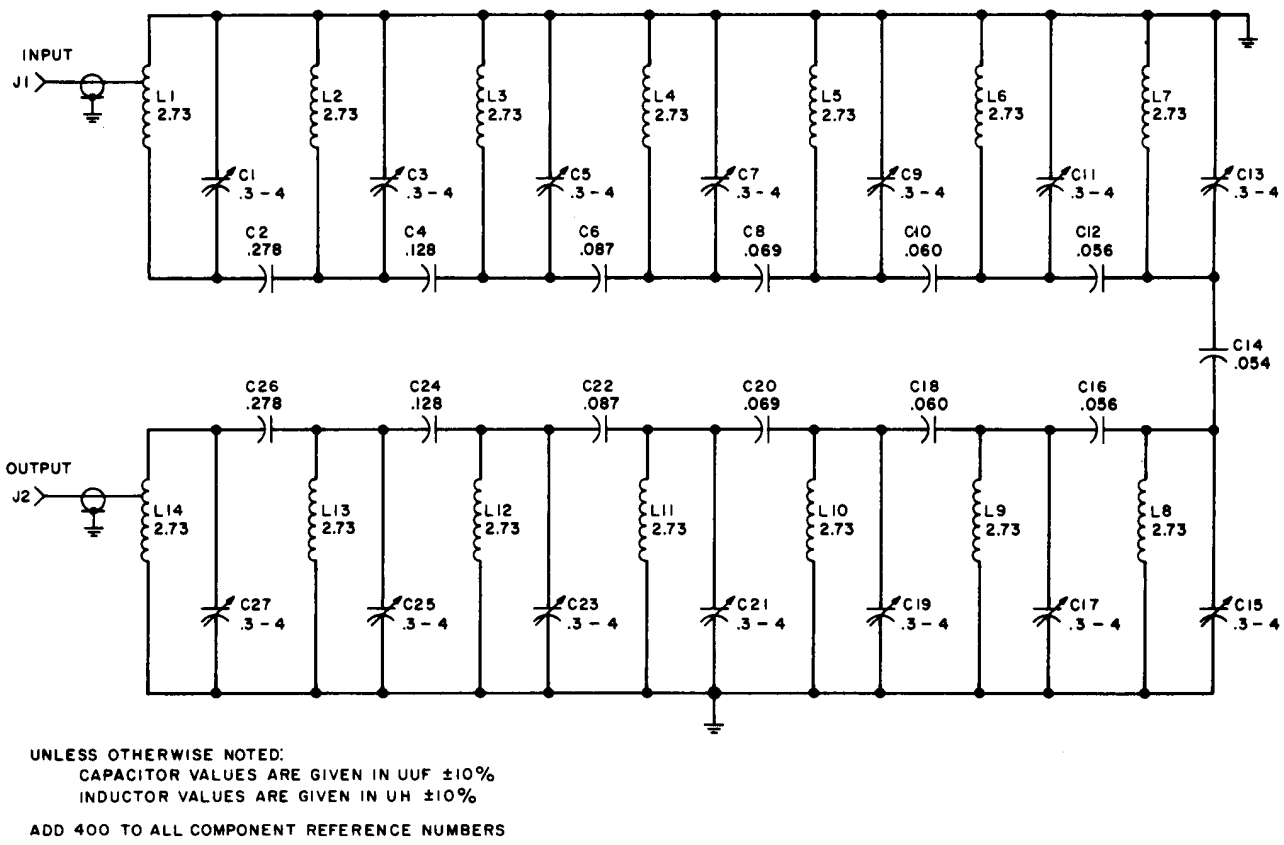
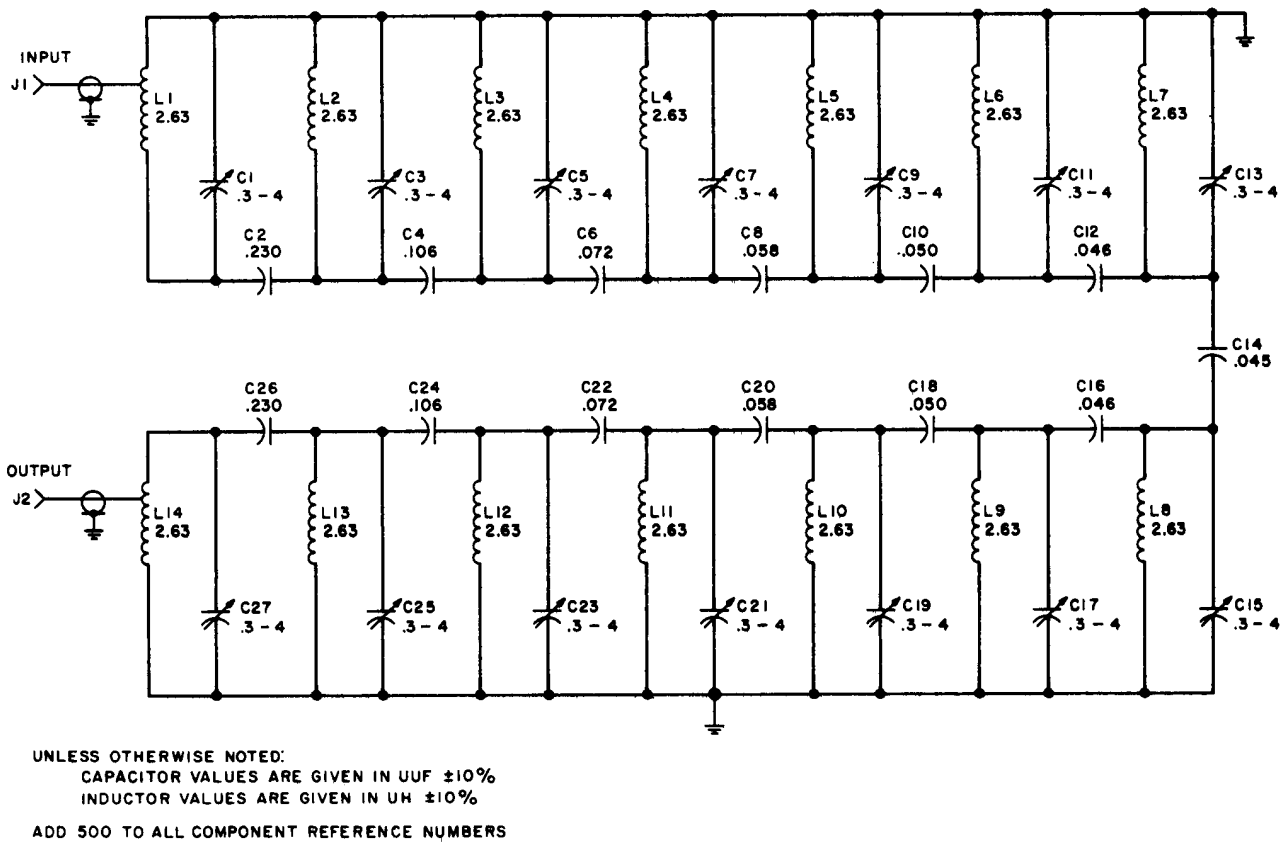


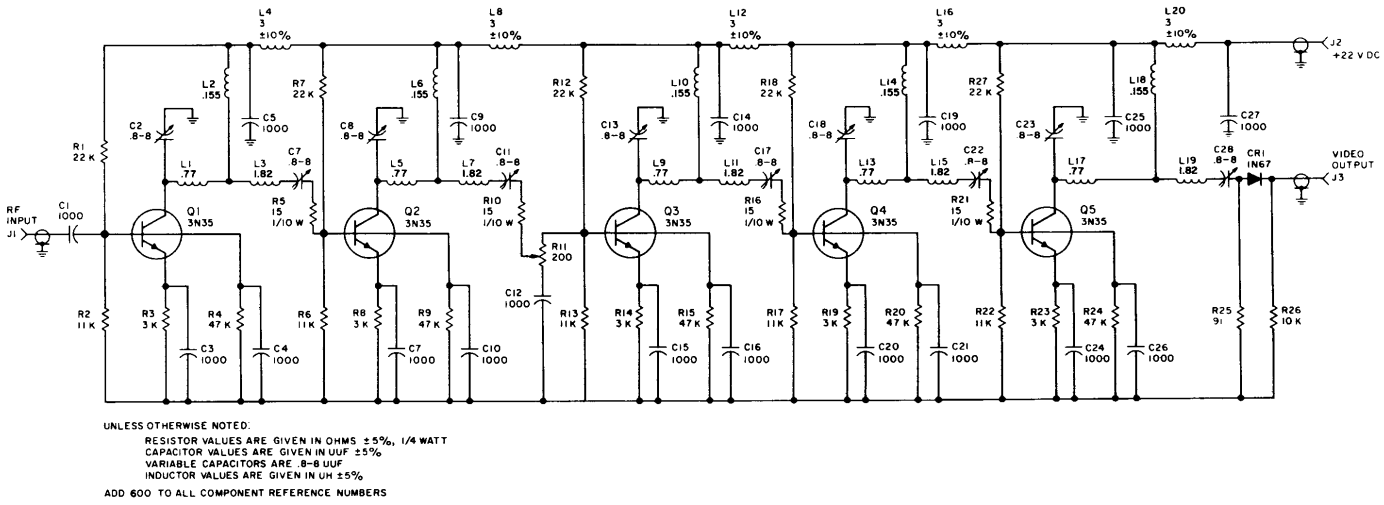
FIGURE 2-5. RF CHANNEL FILTER, 400 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED:
CAPACITOR VALUES ARE GIVEN IN UUF ±10%
INDUCTOR VALUES ARE GIVEN IN UH ±10%

ADD 500 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-6. RF CHANNEL FILTER, 500 UNIT, SCHEMATIC DIAGRAM

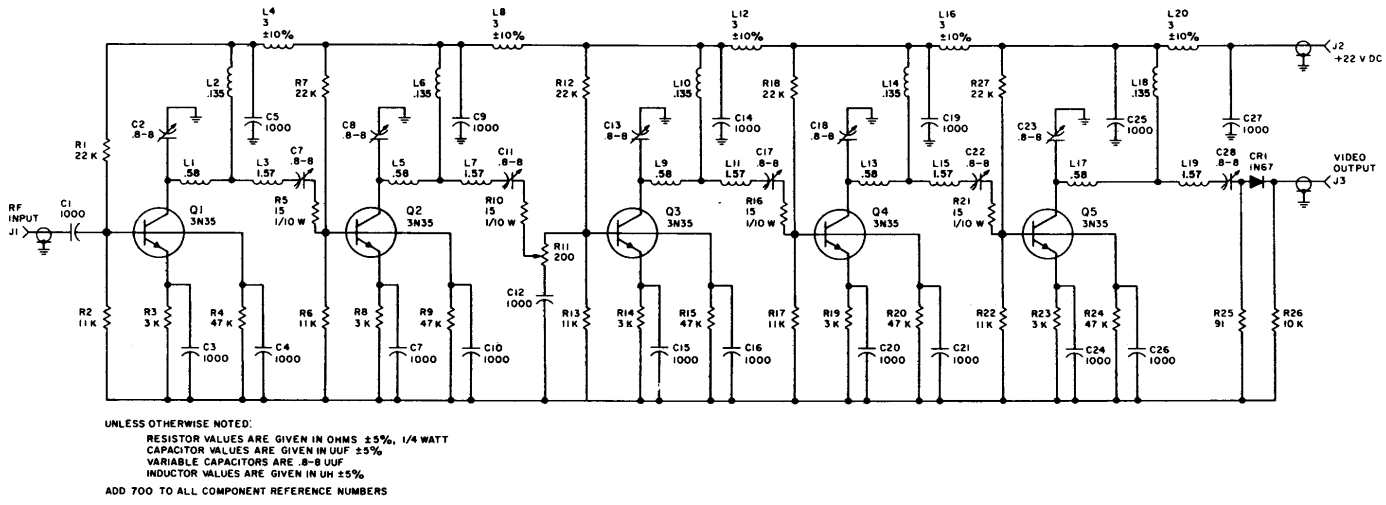


UNLESS OTHERWISE NOTED:

RESISTOR VALUES ARE GIVEN IN OHMS ±5%, 1/4 WATT
CAPACITOR VALUES ARE GIVEN IN UUF ±5%
VARIABLE CAPACITORS ARE .8-8 UUF
INDUCTOR VALUES ARE GIVEN IN UH ±5%

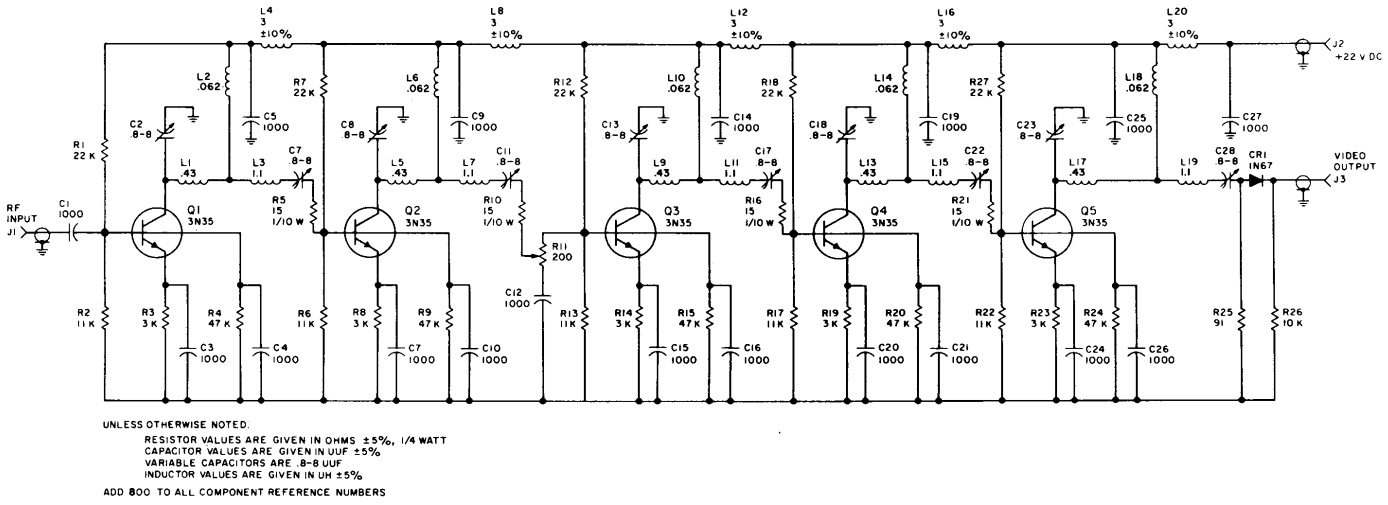
ADD 600 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-8. R F CHANNEL AMPLIFIER, 600 UNIT, SCHEMATIC DIAGRAM



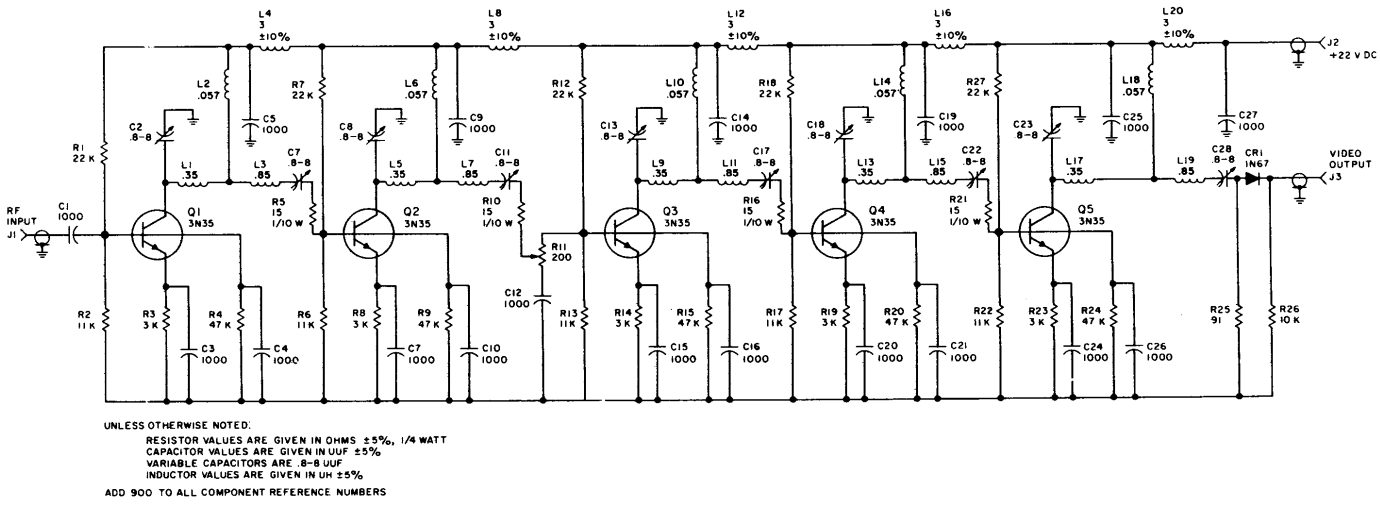
UNLESS OTHERWISE NOTED:
RESISTOR VALUES ARE GIVEN IN OHMS ±5%, 1/4 WATT
CAPACITOR VALUES ARE GIVEN IN UUF ±5%
VARIABLE CAPACITORS ARE .8-8 UUF
INDUCTOR VALUES ARE GIVEN IN UH ±5%
ADD 700 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-9 R F CHANNEL AMPLIFIER, 700 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED.
RESISTOR VALUES ARE GIVEN IN OHMS ±5%, 1/4 WATT
CAPACITOR VALUES ARE GIVEN IN UUF ±5%
VARIABLE CAPACITORS ARE .8-8 UUF
INDUCTOR VALUES ARE GIVEN IN UH ±5%
ADD 800 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-10 R F CHANNEL AMPLIFIER, 800 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED:
RESISTOR VALUES ARE GIVEN IN OHMS ±5%, 1/4 WATT
CAPACITOR VALUES ARE GIVEN IN UUF ±5%
VARIABLE CAPACITORS ARE .8-8 UUF
INDUCTOR VALUES ARE GIVEN IN UH ±5%
ADD 900 TO ALL COMPONENT REFERENCE NUMBERS

FIGURE 2-11. R F CHANNEL AMPLIFIER, 900 UNIT, SCHEMATIC DIAGRAM

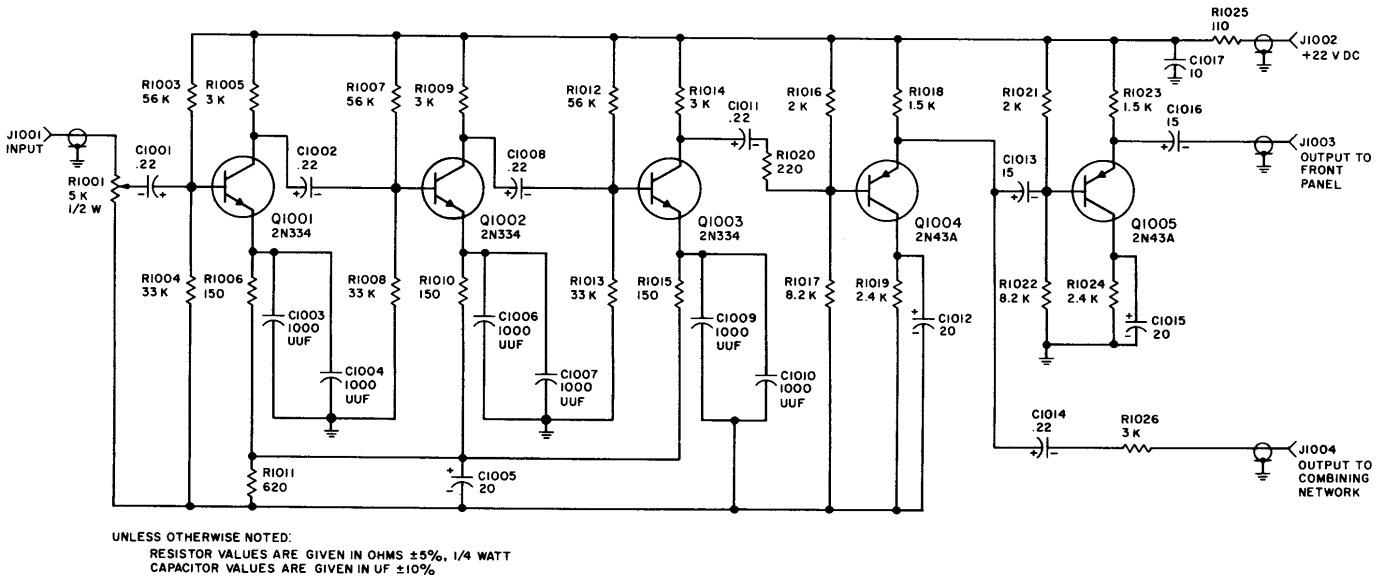


FIGURE 2-12. VIDEO AMPLIFIER, 1000 UNIT, SCHEMATIC DIAGRAM

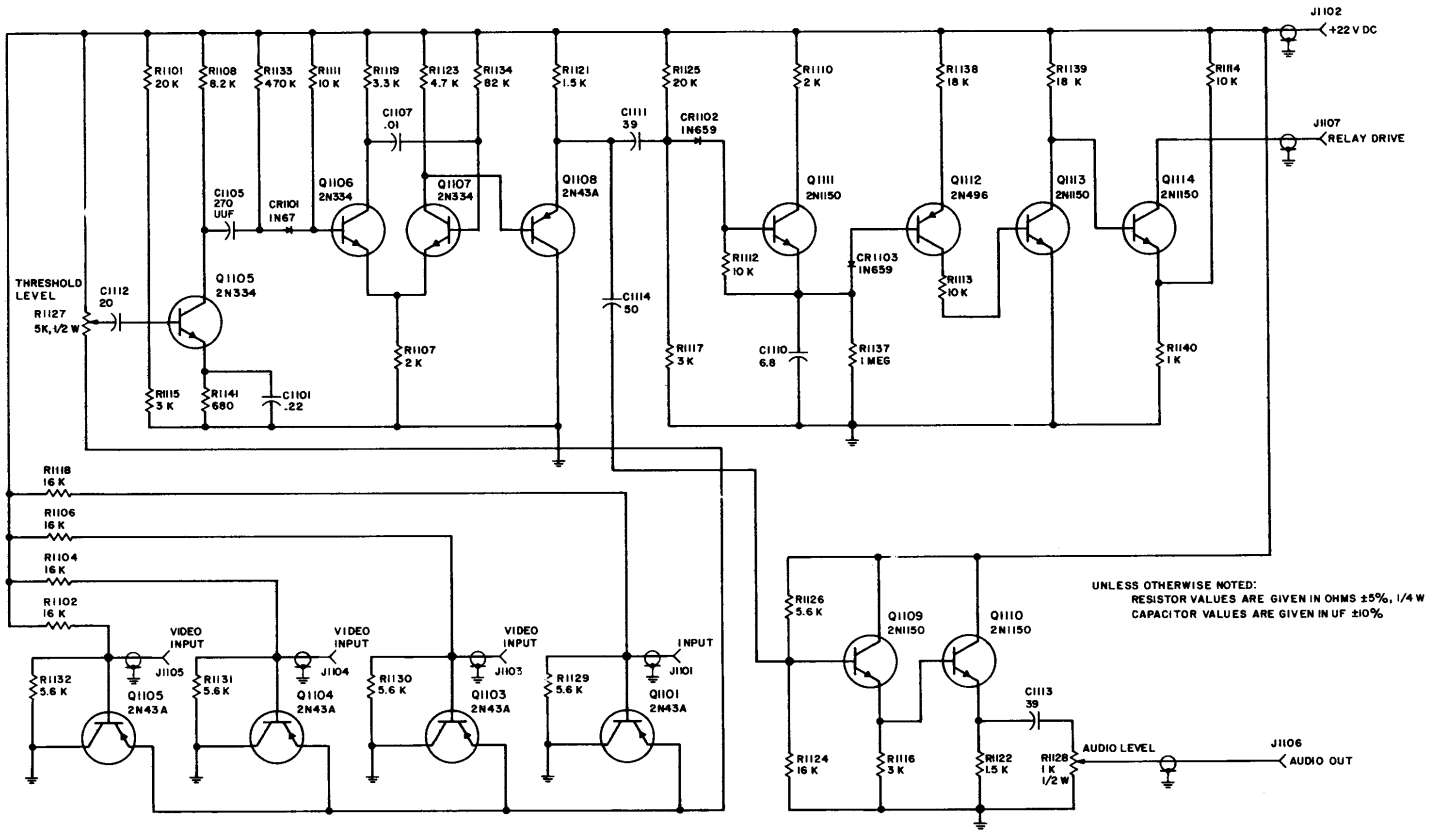
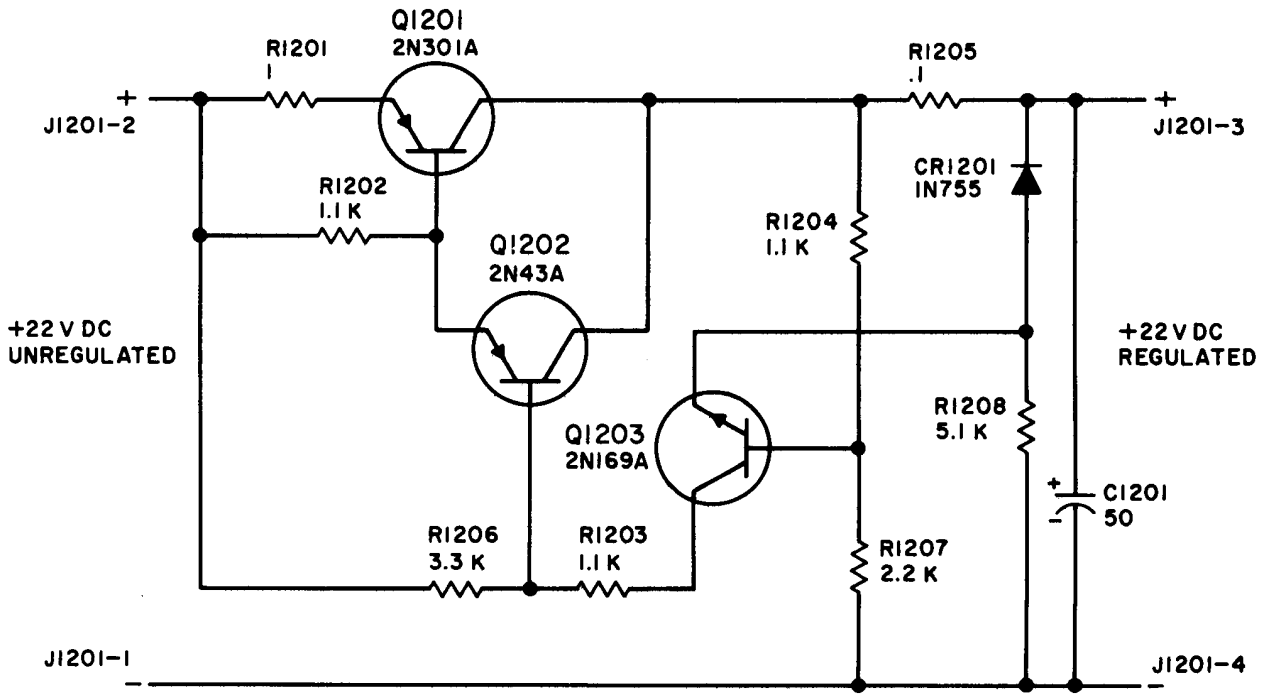


FIGURE 2-13. COMBINING NETWORK, 1100 UNIT, SCHEMATIC DIAGRAM



UNLESS OTHERWISE NOTED:
RESISTOR VALUES ARE GIVEN IN OHMS ±5%, 1/2 WATT
CAPACITOR VALUES ARE GIVEN IN UF ±10% 25 V DC

FIGURE 2-14. VOLTAGE REGULATOR, 1200 UNIT, SCHEMATIC DIAGRAM

SECTION III

OPERATING INSTRUCTIONS

1. INTRODUCTION

The CR-17 FOUR BAND COLLECTION RECEIVER consists of one main assembly to which are mounted the plug-in units. All power and signal connectors and operating controls are situated on the front panel.

2. OPERATING CONTROLS

Refer to Figure 3-1 for locations.

CONTROL	FUNCTION
ON-OFF switch	In the ON position, applies d-c power to the entire receiver.
VIDEO GAIN-1	This is a recessed screwdriver adjustment which allows the operator to select the desired gain in band 1.
VIDEO GAIN-2	Permits selection of desired gain in band 2.
VIDEO GAIN-3	Permits selection of desired gain in band 3.
VIDEO GAIN-4	Permits selection of desired gain in band 4.

THRESHOLD LEVEL	Selects level of signals which will trigger the signal-operated relay.
AUDIO LEVEL	Selects level of stretched audio signals at the AUDIO OUT jack.

3. FRONT PANEL CONNECTIONS

CONNECTION	FUNCTION
ANT IN	Provides 50 ohm antenna input to Broadband RF Preamplifier.
POWER	Accepts 24 to 30 volts d-c to power receiver and provides the connection to signal-operated relay contacts.
VIDEO OUT	Provides access to the four video outputs.
AUDIO OUT	Provides a stretched output for aural monitoring of any signal which triggers the signal-operated relay.

4. INSTALLATION

The CR-17 FOUR BAND COLLECTION RECEIVER contains no internal power supplies. A power supply capable of supplying 24 to 30 volts d-c at 0.180 amperes is required to operate the receiver. The positive output from the supply must be

connected to pin J of the POWER connector and the ground lead must be connected to pin K.

Pins F and H of the POWER connector are wired to the normally open contacts of the signal operated relay. These contacts can be used to activate auxiliary equipment in the presence of RF signals. The signal-operated relay contacts are rated at 110 volts, 60 cycles at 2 amperes for non-inductive loads.

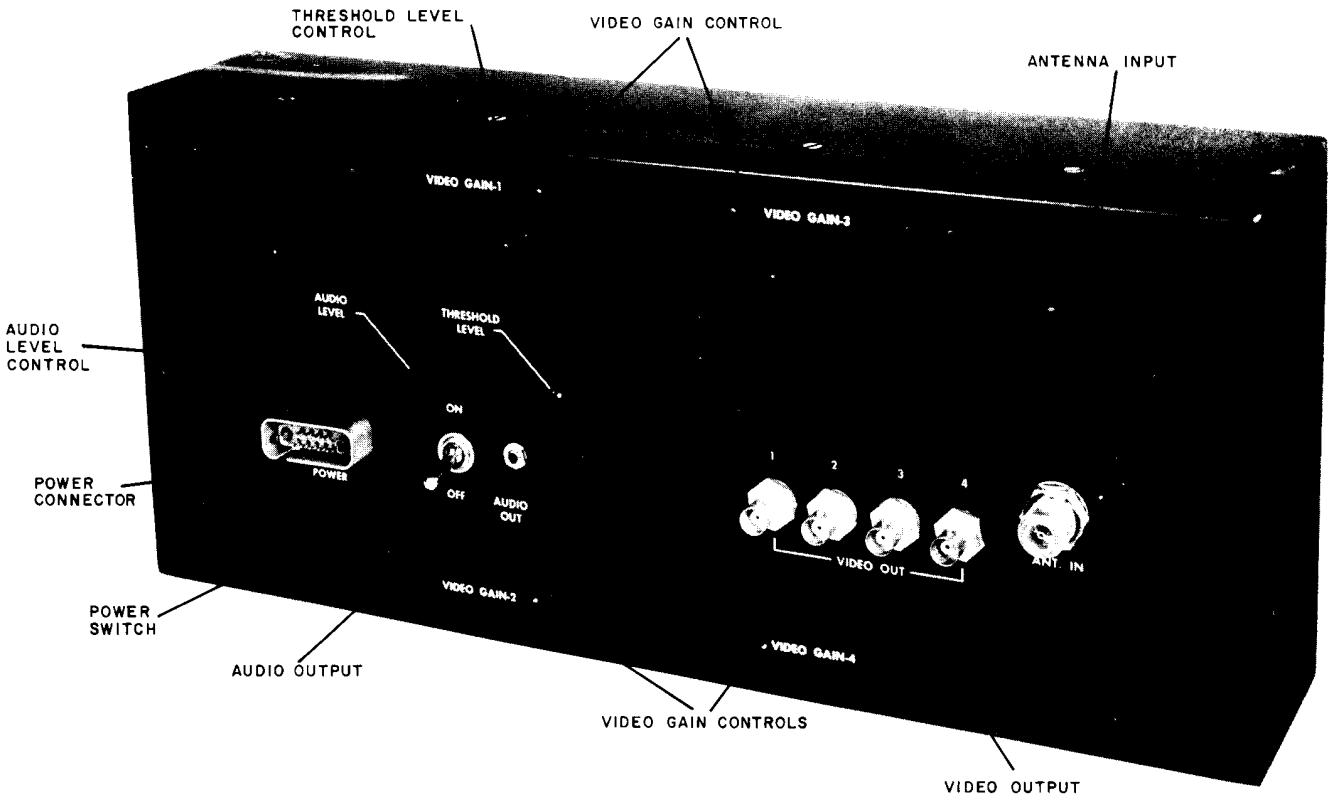


FIGURE 3-1. CR-17 FOUR BAND COLLECTION RECEIVER, FRONT PANEL CONTROLS

SECTION IV

ALIGNMENT AND MAINTENANCE PROCEDURES

1. BROADBAND RF PREAMPLIFIER

Refer to Figure 1-2 for adjustment locations.

1.1 Required Test Equipment

a. Items 1 through 5 of table 4-1 are the standard test equipments required.

b. Table 4-2 lists the special tools required.

c. Power supply: +22 volts d-c at 180 ma.

d. Schematic diagram: Figure 2-13 (for reference)

TABLE 4-1

Standard Test Equipment

	NAME	DESIGNATION	USE
1.	Signal Generator	Measurements Model 80 or Hewlett-Packard 608-d	Calibrated signal
2.	Sweep Frequency Generator	Kay Electric Company Vari-Sweep, Model 400	Alignment Generator
3.	Oscilloscope	Tektronix 541 or equivalent	Alignment Presentation
4.	Two 6 db coaxial pads	Microlab Model AB-6	Terminations for signal and sweep generators
5.	Switch Attenuator	Kay Electric Company Model 20-0	Calibrated Attenuator

	NAME	DESIGNATION	USE
6.	Standing-wave Indicator	Hewlett-Packard 415-A	Output Indicator
7.	Pulse Generator	Measurements Model 79B	Checking Sensitivity
8.	Pulse Generator	Hewlett-Packard 212A	Checking Pulse Response

TABLE 4-2

Required Special Tools

	NAME	USE	
1.	Alignment Tool	Adjustment of Capacitors (JFD)	
2.	Crystal Detector 50 ohm	Alignment of RF amplifiers	Figure 4-7
3.	Probe	Injects RF signal into RF amplifiers	Figure 4-2
4.	RF shorting connection	Alignment of RF pre-amp. and channel amplifiers	Figure 4-2
5.	Adapters, Microdot, #33-91	Adapter from BNC to microdot	
6.	#20 and #2 Allen Wrench	Filter Alignment	

1.2 Test Arrangement

a. Connect test equipment as shown in Figure 4-1.

b. Turn on equipment and allow a 15 minute warm-up period.

c. Adjust the sweep width of scope so that both ends of the trace are visible on the oscilloscope.

d. Set center frequency of sweep generator as indicated in Table 4-3, and sweep width to maximum.

e. Set the output level of the sweep generator to obtain a two box reference level on scope. Use .05 v/cm scale on scope.

f. Set the RF signal generator MODULATION SELECTOR switch to CW, the frequency as in Table 4-3, and increase output until a small pip appears on the scope display.

1.3 Alignment Procedure (Broadband RF Preamplifier, 100 Unit)

a. Remove covers from amplifier.

b. Insert amplifier between sweep output and crystal detector as follows: Connect J103 to detector. Terminate J104, J105 and J106 in 50 ohms. Connect signal lead of probe (see Figure 4-2) to junction of C112, C113, and R111 and the ground lead to a nearby shield, connect the BNC end of probe to the sweep output. Short the junction of L109, C112, and C113 to ground using the RF shorting connector shown in Figure 4-2.

c. Connect +22 volt power supply to J101.

d. Adjust C115 to give a response as shown in Figure 4-3. Insert attenuation by means of the switch attenuator to maintain the reference level of paragraph 1.2.e of this section.

e. The stage gain is the attenuation required in step d. to maintain the reference level. This should be as listed in Table 4-3.

f. Measure the bandwidth as follows: Switch in 3 db of attenuation. Mark the amplitude of the passband (this is the 3 db reference point). Switch out the 3 db attenuator. Measure the bandwidth by moving the RF generator frequency dial (marker generator) to either side of center frequency until the marker pip intercepts the 3 db reference points. Note the intercept frequencies. The intercept frequencies and bandwidth should be as listed in Table 4-3.

g. Move signal lead of probe to the junction of R106, C107 and C108. Move RF shorting connection to junction of L105, C107 and C108.

h. Adjust C109, C112 to give a response as shown in Figure 4-3.

i. Repeat steps e and f.

j. Replace probe with a length of RG-55/U cable with UG-88/U connectors on each end. Connect one end to sweep output and the other end to J102 of amplifier. Remove RF shorting connector from circuit and replace covers.

k. Adjust C103 and C107 to give a response as shown in Figure 4-3.

l. Repeat steps e and f.

2. RF CHANNEL AMPLIFIER

Refer to Figure 1-4 for adjustment locations.

2.1 Required Test Equipment

a. Required Test Equipment - same as IV, 1.1, a.

b. Required special tools - same as IV, 1.1, b.

c. Power supply - same as IV, 1.1, c.

d. Schematic diagram, Figure 2-8 (for reference)

2.2 Test Arrangement

Same as IV, 1.2.

2.3 Alignment Procedure (RF Channel Amplifier, 600 Unit)

a. Remove covers from amplifier.

b. Remove crystal detector from test set-up in Figure 4-1.

c. Insert channel amplifier between sweep output and scope as follows:

Connect J603 of channel amplifier to the vertical input of the scope. Connect signal lead of probe, shown in Figure 4-2, to junction of R621 and C622 and ground lead to nearly shield. Connect the BNC end of probe to sweep output. Connect function of C622 and L615 to ground through RF shorting, connector shown in Figure 4-2.

d. Connect +22 volt power supply to J602.

e. Adjust capacitors C623 and C628 to obtain the response of Figure 4-3.

f. Measure bandwidth and gain as in paragraphs IV, 1.3, e and f.

g. Move signal lead of probe to the junction of R616, and C817. Move RF shorting connector to junction C817 and L811.

h. Adjust C618, C622 to give a response as shown in Figure 4-3.

i. Repeat step f.

j. Move signal lead of probe to the junction of R610 and C611. Move RF shorting connection to junction C611 and L607.

k. Adjust C613 and C617 to give response as shown in Figure 4-3.

l. Repeat step f. For gain measurement adjust R611 to obtain maximum output.

m. Move signal lead of probe to the junction of R605 and C606. Move RF shorting connector to junction C606 and L603.

n. Adjust C608 and C611 to give a response as shown in Figure 4-3.

o. Repeat step f.

p. Remove the probe, and connect a piece of RG-55/U cable between J601 of the channel amplifier and the sweep output. Remove RF shorting connector from circuit and replace covers.

q. Adjust C602 and C606 to give a response as shown in Figure 4-3.

r. Repeat Step f.

NOTE: The preceeding alignment procedure is also applicable to RF channel amplifiers 700 through 900. When aligning these units replace the first digit of component identification numbers in the alignment procedure with the first digit of the corresponding unit number. (Refer to Figures 2-9 through 2-11).

EXAMPLE: When aligning the 700 unit, step 2.3, e will be understood to read: Adjust capacitors C723 and C728, etc.

3. RF CHANNEL FILTER, 200 UNIT

Refer to Figure 1-3 for adjustment locations.

3.1 Required Test Equipment

a. Required test equipment - Table 4-1, Items 1-6.

b. Required special tools - Table 4-2, Items 1, 2, 5 and 6.

c. Power supply: +22 volts dc at 180 ma.

d. Schematic diagram: Figure 2-3 (for reference)

3.2 Test Arrangement

Same as IV, 1.2.

3.3 Alignment Procedure

a. Remove crystal detector from test set-up.

b. Loosen the 14 #2 set screws on the RF Channel Filter.

c. Connect sweep output to J102 on the 100 unit with a length of RG-55/U cable. Connect J103 of the 100 unit to J601 of the 600 unit. Terminate J104, J105, and J106 of the 100 unit in 50 ohms. Connect J603 of the 600 unit to scope input.

d. Connect the +22 volt power supply to J101 of 100 unit and J602 of 600 unit.

e. Adjust the output level of the sweep generator to obtain a two centimeter reference level on the scope. Use .05 v/cm scale on scope.

f. Insert the 200 UNIT between the 100 and 600 units by making the following connections: J103 to J201 and J202 to J601.

g. Increase the sweep output by 30 db.

h. Using the #20 allen wrench, tune each resonator until its response falls within the required passband (see Table 4-4).

i. Decrease the sweep output by about 22 db. Tune resonators for minimum ripple in the passband and for an amplitude equal to the reference level in step d. (See Figure 4-4).

j. Tighten each #2 set screw. NOTE: observe the output as each resonator is secured and readjust the resonator if any change occurs.

3.4 Rejection Measurement

a. Connect test equipment as shown in Figure 4-5.

b. Set the signal generator controls as follows: MODULATION SELECTOR switch to 1000 cps, MOD. LEVEL to about 20% modulation, generator output to -85 dbm and frequency dial to center frequency indicated in Table 4-4.

c. Adjust standing wave indicator RANGE switch and GAIN control to 0 db indication.

d. Move the RF generator frequency dial to center frequency and note the frequencies at which the

standing wave indicator indicates 3 db. These are the band edge frequencies f_1 and f_2.

e. Move the frequency dial of RF generator 1 Mc outside of f_1 and increase the generator output level until the standing wave indicator meter returns to 0 db. Note the generator output level. The difference between this reading and the reference level of step b, is the rejection and should be at least 40 db.

f. Repeat Step e for f_2.

NOTE: The preceeding alignment procedure is also applicable to RF Channel Filters 300 through 500. When aligning this unit replace the first digit of filter component identification numbers in the alignment procedure with the first digit of the corresponding unit number. (Refer to Figure 2-4 through 2-6.) Refer to Figure 2-1 to determine correct RF Channel Amplifier to use with each RF Channel Filter.

4. VIDEO AMPLIFIER, 1000 UNIT

Refer to Figure 1-5 for adjustment location.

4.1 Required Test Equipment

a. Required test equipment - Table 4-1, Items 3, 5 and 7.

b. Power Supply: +22 volts d-c at 180 ma.

c. Schematic diagram: Figure 2-12 (for reference).

4.2 Test Arrangement

a. Connect test equipment as shown in Figure 4-6.

b. Turn on equipment and allow a 15 minute warm-up period.

c. Switch in 6 db attenuation with the switch attenuator.

d. Synchronize scope with pulse generator, and set a reference level of .5 volts pulses on scope.

4.3 Test Procedure

a. Note reference level of paragraph IV, 4.2 d.

b. Connect attenuator output to video amplifier input and video output to scope input.

c. Connect +22 volt power supply to video amplifier power connector.

d. Turn gain control fully clockwise.

e. Switch in attenuation to return scope display to the reference level.

f. The attenuation required in step d is the insertion gain of the video amplifier and should be from 35 to 40 db.

NOTE: The preceding procedure is also applicable to the 1300 unit.

5. COMBINING UNIT, 1100 UNIT

The most comprehensive check of the combining unit is accomplished by observing its operation in a complete receiver. With the receiver completely assembled and with the THRESHOLD LEVEL and AUDIO LEVEL controls fully clockwise, the signal-operated relay will be closed and streched noise pulses of at least 1 volt peak amplitude will be present at the AUDIO OUT jack. The triggering level of the signal-operated relay will be adjustable by means of the THRESHOLD LEVEL control. When the relay has been triggered it will remain closed for at least two seconds.

6. MAINTENANCE

The CR-17 FOUR BAND COLLECTION RECEIVER has no components which require frequent periodic servicing. Normal precautions should be excercised to protect the equipment from rough and careless treatment.

Should the receiver develop a malfunction, the fault should be localized to a specific unit. The block diagram of Figure 2-1 and the theory of operation contained in Section II contain helpful information for fault isolation.

Once the fault has been isolated to a specific unit, the check voltages listed in Table 4-5, the schematic diagrams in Section II, and the test procedures outlined in this section can be employed to locate the component or components which are at fault.

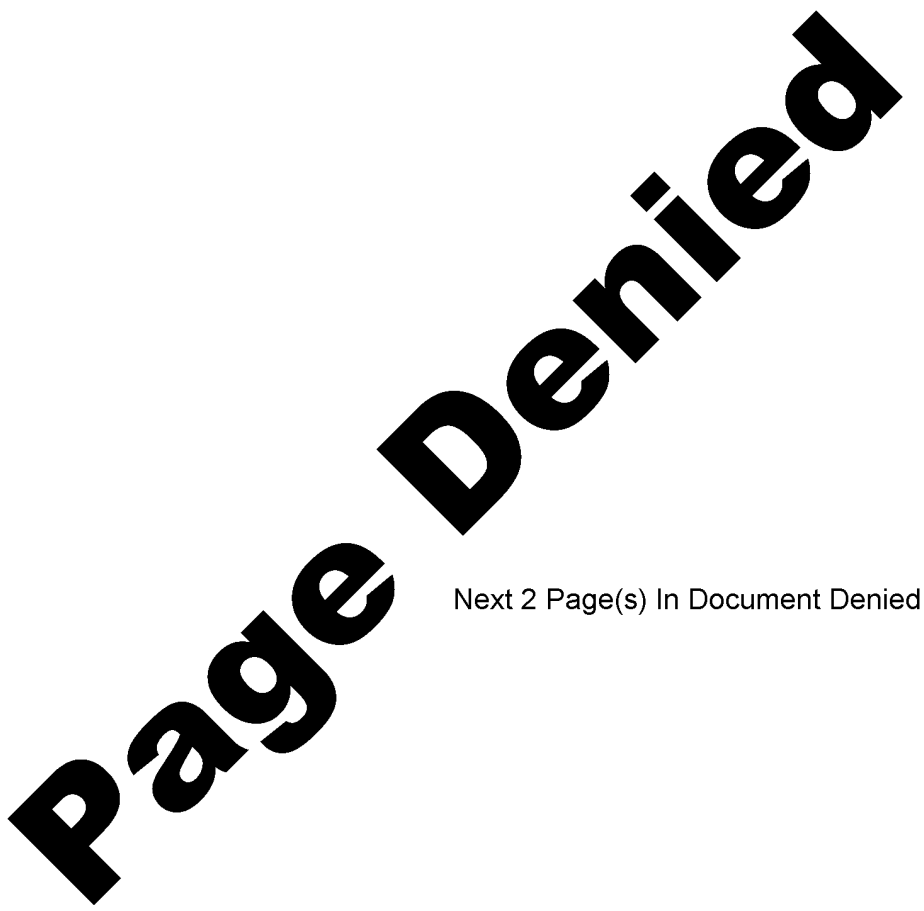


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Table 4-5

VOLTAGE CHART FOR CR-17

FOUR BAND COLLECTION RECEIVER

		VOLTAGE			
UNIT NO.	TRANSISTOR	$BASE_2$	COLLECTOR	$BASE_1$	EMITTER
100	Q101	5.6	22	6.3	5.6
	Q102	5.6	22	6.3	5.6
	Q103	-	0	8.5	9
600	Q601	5.4	22	6.3	5.5
	Q602	5.4	22	6.3	5.5
	Q603	5.4	22	6.3	5.5
	Q604	5.4	22	6.3	5.5
	Q605	5.4	22	6.3	5.5
700	Q701	5.4	22	6.3	5.5
	Q702	5.4	22	6.3	5.5
	Q703	5.5	22	6.3	5.5
	Q704	5.4	22	6.3	5.5
	Q705	5.4	22	6.3	5.5
800	Q801	5.4	22	6.3	5.5
	Q802	5.4	22	6.3	5.5
	Q803	5.4	22	6.3	5.5
	Q804	5.4	22	6.3	5.5

UNIT NO.	TRANSISTOR	$BASE_2$	COLLECTOR	$BASE_1$	EMITTER
900	Q901	5.4	22	6.3	5.5
	Q902	5.4	22	6.3	5.5
	Q903	5.4	22	6.3	5.5
	Q904	5.4	22	6.3	5.5
	Q905	5.4	22	6.3	5.5
1000	Q1001	--	14	5.5	4.8
	Q1002	--	14	5.5	4.8
	Q1003	--	14	5.5	4.8
	Q1004	--	6.3	16.6	16.8
	Q1005	--	6.3	16.6	16.8
1300	Q1301	--	14	5.5	4.8
	Q1302	--	14	5.5	4.8
	Q1303	--	14	5.5	4.8
	Q1304	--	6.3	16.6	16.8
	Q1305	--	6.3	16.6	16.8
1100	Q1101	--	0		6.2
	Q1102	--	0		6.2
	Q1103	--	0		6.2
	Q1104	--	0		6.2
	Q1105	--	11		0.9
	Q1106	--	22		6.8
	Q1107	--	7.1		6.8
	Q1108	--	0		7.3
	Q1109	--	22		14
	Q1110	--	22		13.3

UNIT NO.	TRANSISTOR	$BASE_2$	COLLECTOR	$BASE_1$	EMITTER
	Q1111	--	14.2		3.1
	Q1112	--	1.5		4
1100	Q1113	--	.18	.66	0
	Q1114	--	22	.18	1.9
1200	Q1201	--	21.5	23.6	24
	Q1202	--	21.5	23.5	23.6
	Q1203	--	23.3	14.4	14.4

NOTE: All voltage measurements referenced to ground.

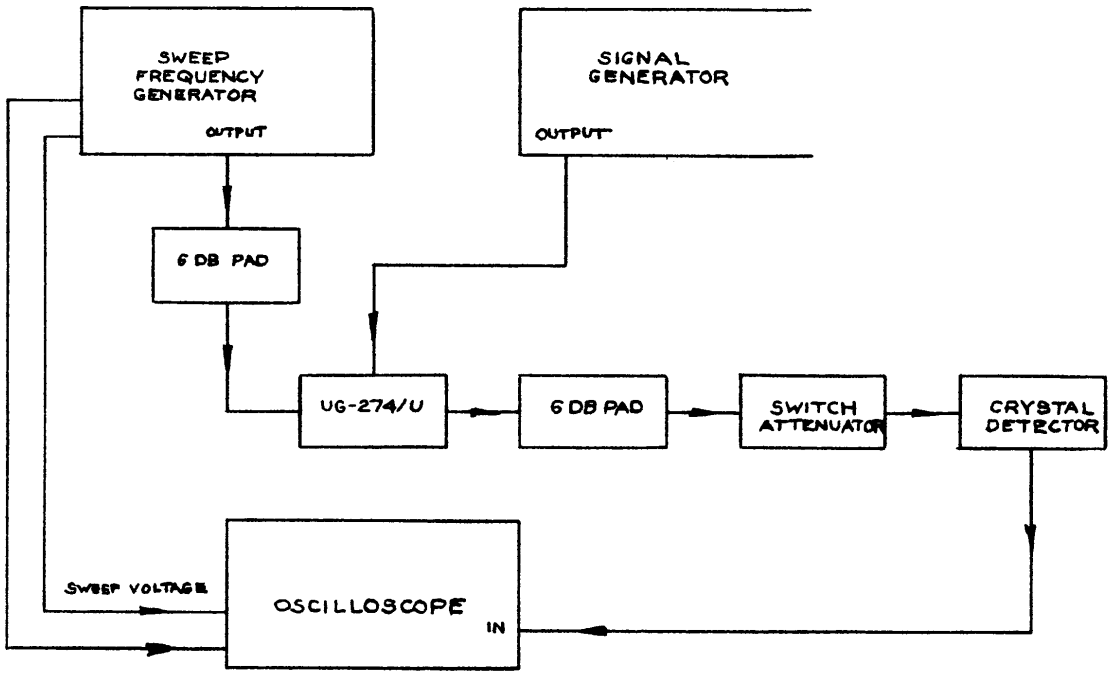
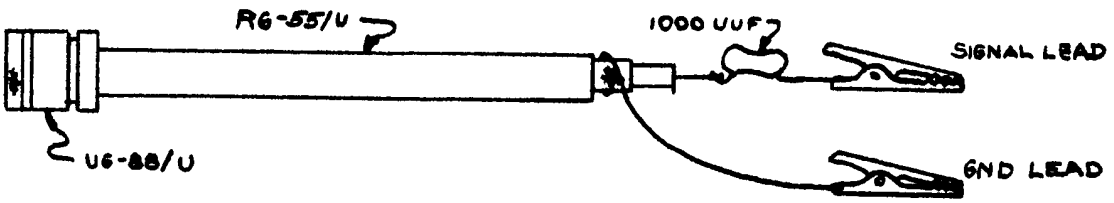


FIGURE 4-1. ARRANGEMENT FOR ALIGNING AMPLIFIERS AND FILTERS



RF TEST PROBE

RF SHORTING CONNECTOR

FIGURE 4-2. RF TEST PROBE AND RF SHORTING CONNECTOR

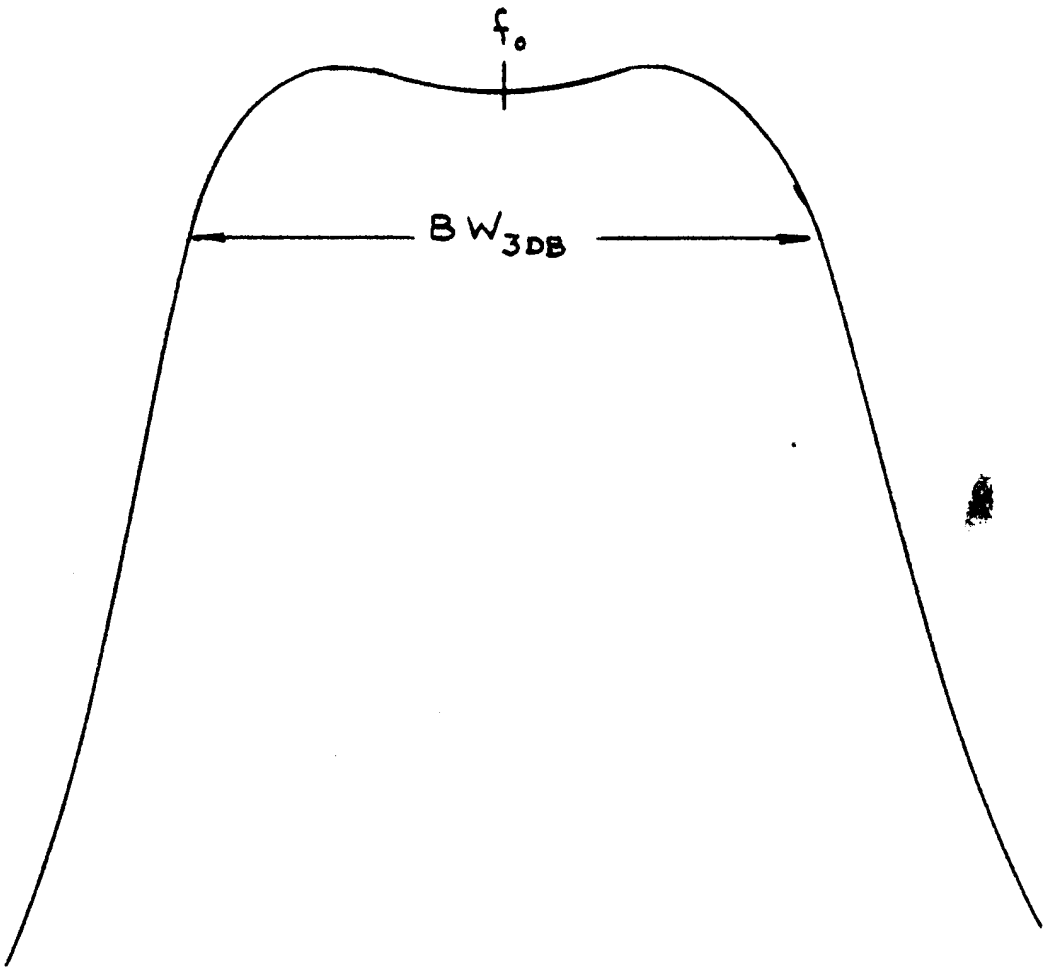


FIGURE 4-3 TYPICAL RESPONSE OF DOUBLE TUNED AMPLIFIER

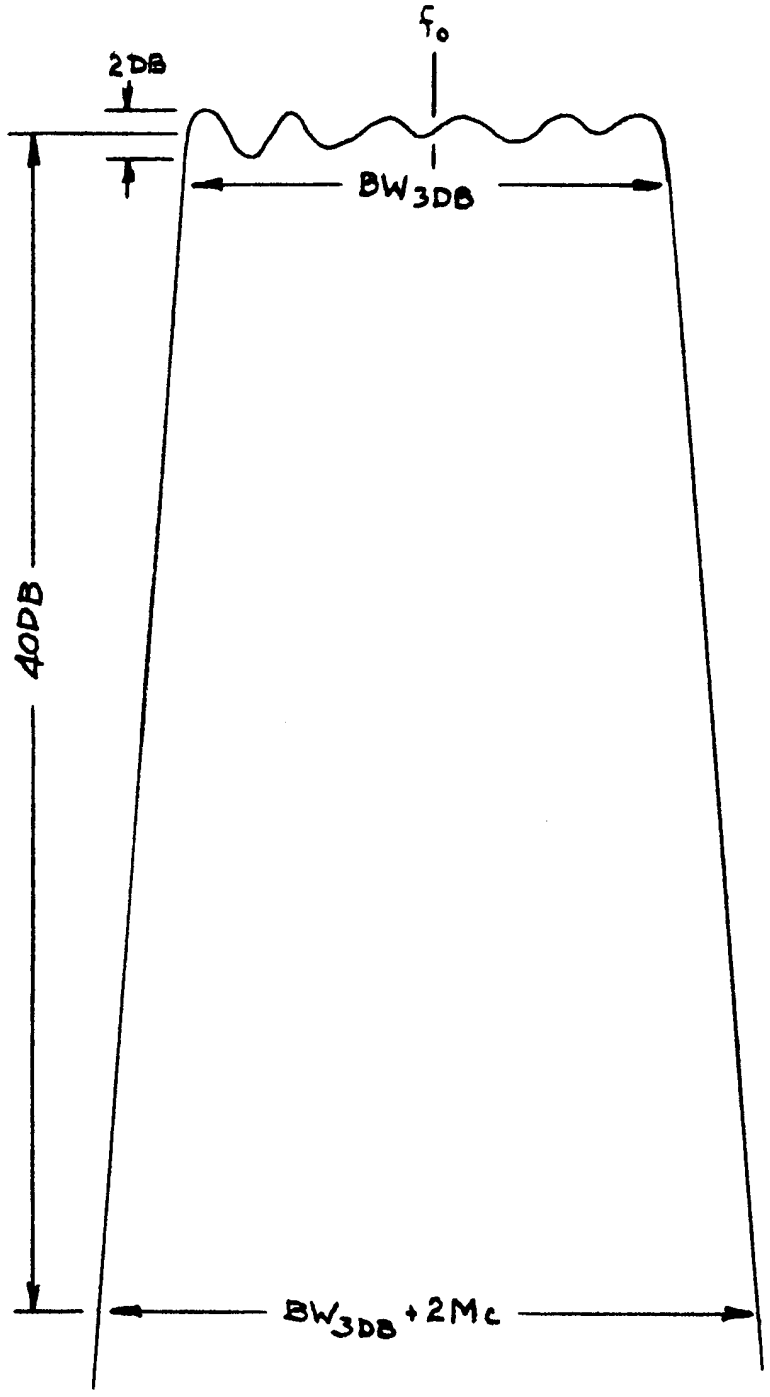


FIGURE 4-4. TYPICAL RESPONSE OF COMPLETELY ALIGNED RF CHANNEL

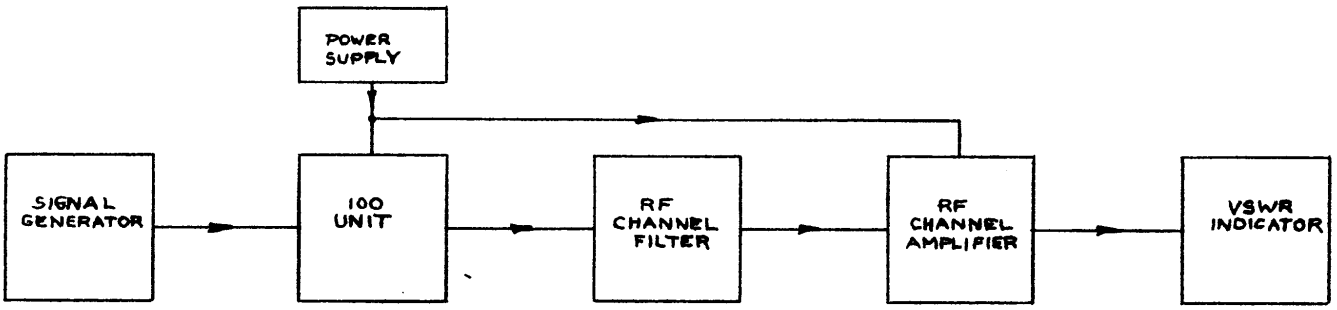


FIGURE 4-5. ARRANGEMENT FOR MEASURING REJECTION OF RF CHANNELS

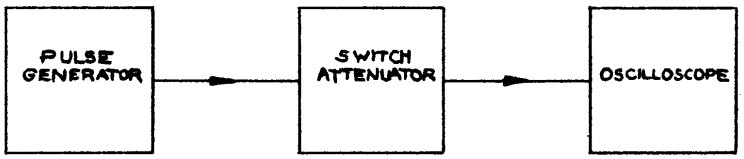


FIGURE 4-6. ARRANGEMENT FOR TESTING VIDEO AMPLIFIERS

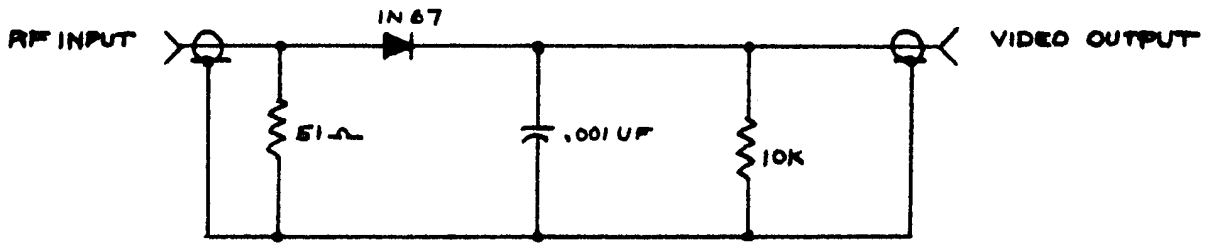


FIGURE 4-7. CRYSTAL DETECTOR

SECTION V

REPLACEABLE PARTS LISTS

TABLE 5-1

List of Replaceable Parts

Broadband RF Preamplifier, 100 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R101	Resistor, fixed, composition, 22K, ± 5%, 1/4W	RC07GF223J	2
R102	Resistor, fixed, composition, 11K, ± 5%, 1/4W	RC07GF113J	2
R103	Resistor, fixed, composition, 5.6K, ± 5%, 1/4W	RC07GF562J	2
R104	Resistor, fixed, composition, 75K, ± 5%, 1/4W	RC07GF753J	2
R105	Not used		
R106	Resistor, fixed, composition, 15 ohm, ± 10%, 1/10W	Ohmite	2
R107	Same as R102		
R108	Same as R101		
R109	Not used		
R110	Same as R103		
R111	Same as R104		
R112	Same as R106		
R113	Resistor, fixed, composition, 6.8K, ± 5%, 1/4W	RC07GF682J	1
R114	Resistor, fixed, composition, 12K, ± 5%, 1/4W	RC07GF123J	1
R115	Resistor, fixed, composition, 1.2K, ± 5%, 1/4W	RC07GF122J	1
R116	Resistor, fixed, composition, 5.1K, ± 5%, 1/4W	RC07GF512J	1

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R117	Resistor, fixed, composition, 39 ohms, ± 5%, 1/2W	RC20GF390J	4
R118 thru R120	Same as R117		
C101	Capacitor, fixed, mica, 1000 uuf, ± 10%	Arco-El Menco DM-15-102K	10
C102	Same as C101		
C103	Capacitor, variable .8-8.5 uuf	JFD VC9GW	6
C104 thru C106	Same as C101		
C107	Same as C103		
C108	Capacitor, fixed, mica, 5 uuf, ± 10%	Arco-El Menco DM-15-050K	1
C109	Same as C103		
C110	Same as C101		
C111	Same as C101		
C112	Same as C103		
C113	Capacitor, fixed, mica, 3 uuf, ± 10%	Arco-El Menco DM-15-030K	
C114	Same as C101		
C115	Same as C103		
C116	Same as C101		
C117	Same as C103		
C118	Capacitor, fixed, mica, 11 uuf, ± 10%	Arco-El Menco DM-15-110K	1
C119	Same as C101		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
L101	Coil, RF, .25 uh	Jeffers Electronics 10100-1	1
L102	Choke, RF, 3 uh		3
L103	Coil, RF		3
L104	Coil, RF		3
L105	Coil, RF		3
L106	Same as L102		
L107	Same as L103		
L108	Same as L104		
L109	Same as L105		
L110	Same as L102		
L111	Same as L103		
L112	Same as L104		
L113	Same as L105		
Q101	Transistor	Texas Inst. 3N35	2
Q102	Same as Q101		
Q103	Transistor	Texas Inst. 2N1143	1

STAT

RF Channel Filter, 200 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C201	Capacitor, variable	Part of Chassis	14
C202	Capacitor, fixed		2
C203	Same as C201		
C204	Capacitor, fixed		2
C205	Same as C201		
C206	Capacitor, fixed		2
C207	Same as C201		
C208	Capacitor, fixed		2
C209	Same as C201		
C210	Capacitor, fixed		2
C211	Same as C201		
C212	Capacitor, fixed		2
C213	Same as C201		
C214	Capacitor, fixed		1
C215	Same as C201		
C216	Same as C212		
C217	Same as C201		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C218	Same as C210		
C219	Same as C201		
C220	Same as C208		
C221	Same as C201		
C222	Same as C206		
C223	Same as C201		
C224	Same as C204		
C225	Same as C201		
C226	Same as C202		
C227	Same as C201		
L201 thru L214	Coil, RF	[redacted]	14

STAT

RF Channel Filter, 300 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C301	Capacitor, variable	Part of Chassis	14
C302	Capacitor, fixed		2
C303	Same as C301		
C304	Capacitor, fixed		2
C305	Same as C301		
C306	Capacitor, fixed		2
C307	Same as C301		
C308	Capacitor, fixed		2
C309	Same as C301		
C310	Capacitor, fixed		2
C311	Same as C301		
C312	Capacitor, fixed		2
C313	Same as C301		
C314	Capacitor, fixed		1
C315	Same as C301		
C316	Same as C312		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C317	Same as C301		
C318	Same as C310		
C319	Same as C301		
C320	Same as C308		
C321	Same as C301		
C322	Same as C306		
C323	Same as C301		
C324	Same as C304		
C325	Same as C301		
C326	Same as C302		
C327	Same as C301		
L301 thru L314	Coil, RF		14

STAT

RF Channel Filter, 400 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C401	Capacitor, variable	Part of Chassis	14
C402	Capacitor, fixed		2
C403	Same as C401		
C404	Capacitor, fixed		2
C405	Same as C401		
C406	Capacitor, fixed		2
C407	Same as C401		
C408	Capacitor, fixed		2
C409	Same as C401		
C410	Capacitor, fixed		2
C411	Same as C401		
C412	Capacitor, fixed		2
C413	Same as C401		
C414	Capacitor, fixed		1
C415	Same as C401		
C416	Same as C412		
C417	Same as C401		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C418	Same as C410		
C419	Same as C401		
C420	Same as C408		
C421	Same as C401		
C422	Same as C406		
C423	Same as C401		
C424	Same as C404		
C425	Same as C401		
C426	Same as C402		
C427	Same as C401		
L401 thru L414	Coil, RF		14

STAT

RF Channel Filter, 500 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C501	Capacitor, Variable	Part of Chassis	14
C502	Capacitor, fixed		2
C503	Same as C501		
C504	Capacitor, fixed		2
C505	Same as C501		
C506	Capacitor, fixed		2
C507	Same as C501		
C508	Capacitor, fixed		
C509	Same as C501		
C510	Capacitor, fixed		2
C511	Same as C501		
C512	Capacitor, fixed		2
C513	Same as C501		
C514	Capacitor, fixed		1
C515	Same as C501		
C516	Same as C512		
C517	Same as C501		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C518	Same as C510		
C519	Same as C501		
C520	Same as C508		
C521	Same as C501		
C522	Same as C506		
C523	Same as C501		
C524	Same as C504		
C525	Same as C501		
C526	Same as C502		
C527	Same as C501		
L501	Coil, RF		14

STAT

RF Channel Amplifier, 600 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R601	Resistor, fixed, composition 22K, ± 5%, 1/4W	RC07GF223J	5
R602	Resistor, fixed, composition 11K, ± 5%, 1/4W	RC07GF113J	5
R603	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	5
R604	Resistor, fixed, composition 47K, ± 5%, 1/4W	RC07GF473J	5
R605	Resistor, fixed, composition 15 ohm, ± 10%, 1/10W	Ohmite	4
R606	Same as R602		
R607	Same as R601		
R608	Same as R603		
R609	Same as R604		
R610	Same as R605		
R611	Resistor, variable, glass 2K, 1/2W	Heli Trim Model 50	1
R612	Same as R601		
R613	Same as R602		
R614	Same as R603		
R615	Same as R604		
R616	Same as R605		
R617	Same as R602		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R618	Same as R601		
R619	Same as R603		
R620	Same as R604		
R621	Same as R605		
R622	Same as R602		
R623	Same as R603		
R624	Same as R604		
R625	Resistor, fixed, composition 91 ohm, ± 5%, 1/4W	RC07GF910J	1
R626	Resistor, fixed, composition 10K, ± 5%, 1/4W	RC97GF103J	1
R627	Same as R601		
C601	Capacitor, fixed, mica 1000 uuf, ± 10%	Arco-ElMenco DM-15-102K	18
C602	Capacitor, variable, glass .8-8.5 uuf	JFD VC9GW	10
C603	Same as C601		
C604	Same as C601		
C605	Same as C601		
C606	Same as C602		
C607	Same as C601		
C608	Same as C602		
C609	Same as C601		
C610	Same as C601		
C611	Same as C602		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C612	Same as C601		
C613	Same as C602		
C614	Same as C601		
C615	Same as C601		
C616	Same as C601		
C617	Same as C602		
C618	Same as C602		
C619	Same as C601		
C620	Same as C601		
C621	Same as C601		
C622	Same as C602		
C623	Same as C602		
C624	Same as C601		
C625	Same as C601		
C626	Same as C601		
C627	Same as C601		
C628	Same as C602		
L601	Coil, RF		5
L602	Coil, RF		5
L603	Coil, RF		5
L604	Choke, RF		5
L605	Same as L601		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
L606	Same as L602		
L607	Same as L603		
L608	Same as L604		
L609	Same as L601		
L610	Same as L602		
L611	Same as L603		
L612	Same as L604		
L613	Same as L601		
L614	Same as L602		
L615	Same as L603		
L616	Same as L604		
L617	Same as L601		
L618	Same as L602		
L619	Same as L603		
L620	Same as L604		
Q601 thru Q605	Transistor	Texas Inst. 3N35	5
CR601	Diode, Germanium	Raytheon 1N67	1

RF Channel Amplifier, 700 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R701	Resistor, fixed, composition 22K, ± 5%, 1/4W	RC07GF223J	5
R702	Resistor, fixed, composition- 11K, ± 5%, 1/4W	RC07GF113J	5
R703	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	5
R704	Resistor, fixed, composition 47K, ± 5%, 1/4W	RC07GF473J	5
R705	Resistor, fixed, composition 15 ohm, ± 10%, 1/10W	Ohmite	4
R706	Same as R702		
R707	Same as R701		
R708	Same as R703		
R709	Same as R704		
R710	Same as R705		
R711	Resistor, variable, glass 2K, 1/2W	Heli Trim Model 50	1
R712	Same as R701		
R713	Same as R702		
R714	Same as R703		
R715	Same as R704		
R716	Same as R705		
R717	Same as R702		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R718	Same as R701		
R719	Same as R703		
R720	Same as R704		
R721	Same as R705		
R722	Same as R702		
R723	Same as R703		
R724	Same as R704		
R725	Resistor, fixed, composition 91 ohm, ± 5%, 1/4W	RC07GF910J	1
R726	Resistor, fixed, composition 10K, ± 5%, 1/4W	RC07GF103J	1
R727	Same as R701		
C701	Capacitor, fixed, mica 1000 uuf, ± 10%	Arco-ElMenco DM-15-102K	18
C702	Capacitor, variable, glass .8-8.5 uuf	JFD VC9GW	10
C703	Same as C701		
C704	Same as C701		
C705	Same as C701		
C706	Same as C702		
C707	Same as C701		
C708	Same as C702		
C709	Same as C701		
C710	Same as C701		
C711	Same as C702		
C712	Same as C701		
C713	Same as C702		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C714	Same as C701		
C715	Same as C701		
C716	Same as C701		
C717	Same as C702		
C718	Same as C702		
C719	Same as C701		
C720	Same as C701		
C721	Same as C701		
C722	Same as C702		
C723	Same as C702		
C724	Same as C701		
C725	Same as C701		
C726-	Same as C701		
C727	Same as C701		
C728	Same as C702		
L701	Coil, RF		5
L702	Coil, RF		5
L703	Coil, RF		5
L704	Choke, RF		5
L705	Same as L701		
L706	Same as L702		
L707	Same as L703		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
L708	Same as L704		
L709	Same as L701		
L710	Same as L702		
L711	Same as L703		
L712	Same as L704		
L713	Same as L701		
L714	Same as L702		
L715	Same as L703		
L716	Same as L704		
L717	Same as L701		
L718	Same as L702		
L719	Same as L703		
L720	Same as L704		
Q701 thru Q705	Transistor	Texas Instruments 3N35	5
CR701	Diode, Germanium	Raytheon, 1N67	1

RF Channel Amplifier, 800 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R801	Resistor, fixed, composition 22K, ± 5%, 1/4W	RC07GF223J	5
R802	Resistor, fixed, composition 11K, ± 5%, 1/4W	RC07GF113J	5
R803	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	5
R804	Resistor, fixed, composition 47K, ± 5%, 1/4W	RC07GF473J	5
R805	Resistor, fixed, composition 15 ohm, ± 10%, 1/10W	Ohmite	4
R806	Same as R802		
R807	Same as R801		
R808	Same as R803		
R809	Same as R804		
R810	Same as R805		
R811	Resistor, variable, glass 2K, 1/2W	Heli Trim Model 50	1
R812	Same as R801		
R813	Same as R802		
R814	Same as R803		
R815	Same as R804		
R816	Same as R805		
R817	Same as R802		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R818	Same as R801		
R819	Same as R803		
R820	Same as R804		
R821	Same as R805		
R822	Same as R802		
R823	Same as R803		
R824	Same as R804		
R825	Resistor, fixed, composition 91 ohm, ± 5%, 1/4W	RC07GF910J	1
R826	Resistor, fixed, composition 10K, ± 5%, 1/4W	RC07GF103J	1
R827	Same as R801		
C801	Capacitor, fixed, mica 1000 uuf, ± 10%	Arco-ElMenco DM-15-102K	18
C802	Capacitor, variable, glass .8-8.5 uuf	JFD VC9GW	10
C803	Same as C801		
C804	Same as C801		
C805	Same as C801		
C806	Same as C802		
C807	Same as C801		
C808	Same as C802		
C809	Same as C801		
C810	Same as C801		
C811	Same as C802		
C812	Same as C801		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C813	Same as C802		
C814	Same as C801		
C815	Same as C801		
C816	Same as C801		
C817	Same as C302		
C818	Same as C802		
C819	Same as C801		
C820	Same as C801		
C821	Same as C801		
C822	Same as C802		
C823	Same as C802		
C824	Same as C801		
C825	Same as C801		
C826	Same as C801		
C827	Same as C801		
C828	Same as C802		
L801	Coil, RF		5
L802	Coil, RF		5
L803	Coil, RF		5
L804	Choke, RF		5
L805	Same as L801		
L806	Same as L802		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
L807	Same as L803		
L808	Same as L804		
L809	Same as L801		
L810	Same as L802		
L811	Same as L803		
L812	Same as L804		
L813	Same as L801		
L814	Same as L802		
L815	Same as L803		
L816	Same as L804		
L817	Same as L801		
L818	Same as L802		
L819	Same as L803		
L820	Same as L804		
Q801 thru Q805	Transistor	Texas Inst. 3N35	5
CR801	Diode, Germanium	Raytheon 1N67	1

RF Channel Amplifier, 900 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R901	Resistor, fixed, composition 22K, ± 5%, 1/4W	RC07GF223J	5
R902	Resistor, fixed, composition 11K, ± 5%, 1/4W	RC07GF113J	5
R903	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	5
R904	Resistor, fixed, composition 47K, ± 5%, 1/4W	RC07GF473J	5
R905	Resistor, fixed, composition 15 ohm, ± 10%, 1/10W	Ohmite	4
R906	Same as R902		
R907	Same as R901		
R908	Same as R903		
R909	Same as R904		
R910	Same as R905		
R911	Resistor, variable, glass 2K, 1/2W	Heli Trim Model 50	1
R912	Same as R901		
R913	Same as R902		
R914	Same as R903		
R915	Same as R904		
R916	Same as R905		
R917	Same as R902		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R918	Same as R901		
R919	Same as R903		
R920	Same as R904		
R921	Same as R905		
R922	Same as R902		
R923	Same as R903		
R924	Same as R904		
R925	Resistor, fixed, composition 91 ohm, ± 5%, 1/4W	RC07GF910J	1
R926	Resistor, fixed, composition 10K, ± 5%, 1/4W	RC07GF103J	1
R927	Same as R901		
C901	Capacitor, fixed, mica 1000 uuf, ± 10%	Arco-ElMenco DM-15-102K	18
C902	Capacitor, variable, glass .8-8.5 uuf	JFD VC9GW	
C903	Same as C901		
C904	Same as C901		
C905	Same as C901		
C906	Same as C902		
C907	Same as C901		
C908	Same as C902		
C909	Same as C901		
C910	Same as C901		
C911	Same as C902		
C912	Same as C901		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C913	Same as C902		
C914	Same as C901		
C915	Same as C901		
C916	Same as C901		
C917	Same as C902		
C918	Same as C902		
C919	Same as C901		
C920	Same as C901		
C921	Same as C901		
C922	Same as C902		
C923	Same as C902		
C924	Same as C901		
C925	Same as C901		
C926	Same as C901		
C927	Same as C901		
C928	Same as C902		
L901	Coil, RF		5
L902	Coil, RF		5
L903	Coil, RF		5
L904	Choke, RF		5
L905	Same as L901		
L906	Same as L902		
L907	Same as L903		
L908	Same as L904		

STAT

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
L909	Same as L901		
L910	Same as L902		
L911	Same as L903		
L912	Same as L904		
L913	Same as L901		
L914	Same as L902		
L915	Same as L903		
L916	Same as L904		
L917	Same as L901		
L918	Same as L902		
L919	Same as L903		
L920	Same as L904		
Q901 thru Q905	Transistor	Texas Inst. 3N35	5
CR901	Diode, Germanium	Raytheon 1N67	1

Video Amplifier, 1000 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R1001	Resistor, variable 5K, ± 20%, 1/2W	Allen-Bradley Type G	1
R1002	Not used		
R1003	Resistor, fixed, composition 56K, ± 5%, 1/4W	RC07GF563J	3
R1004	Resistor, fixed, composition 33K, ± 5%, 1/4W	RC07GF333J	3
R1005	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	3
R1006	Resistor, fixed, composition 150 ohm, ± 5%, 1/4W	RC07GF151J	3
R1007	Same as R1003		
R1008	Same as R1004		
R1009	Same as R1005		
R1010	Same as R1006		
R1011	Resistor, fixed, composition 620 ohm, ± 5%, 1/4W	RC07GF621J	1
R1012	Same as R1003		
R1013	Same as R1004		
R1014	Same as R1005		
R1015	Same as R1006		
R1016	Resistor, fixed, composition 2K, ± 5%, 1/4W	RC07GF202J	2
R1017	Resistor, fixed, composition 8.2K, ± 5%, 1/4W	RC07GF822J	2

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R1018	Resistor, fixed, composition 1.5K, ± 5%, 1/4W	RC07GF152J	2
R1019	Resistor, fixed, composition 2.4K, ± 5%, 1/4W	RC07GF242J	1
R1020	Resistor, fixed, composition 220 ohm, ± 5%, 1/4W	RC07GF221J	1
R1021	Same as R1016		
R1022	Same as R1017		
R1023	Same as R1018		
R1024	Resistor, fixed, composition 2.4K, ± 5%, 1/4W	RC07GF242J	1
R1025	Resistor, fixed, composition 110 ohm, ± 5%, 1/4W	RC07GF111J	1
R1026	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	1
C1001	Capacitor, fixed, electrolitic .22 uf, ± 20%	Sprague 150D225X0035A2	5
C1002	Same as C1001		
C1003	Capacitor, fixed, mica 1000 uuf, ± 10%	Arco-ElMenco DM-15-102K	6
C1004	Same as C1003		
C1005	Capacitor, fixed, tantalitic 20 uf, ± 10%	Sprague TE1157	3
C1006	Same as C1003		
C1007	Same as C1003		
C1008	Same as C1001		
C1009	Same as C1003		
C1010	Same as C1003		
C1011	Same as C1001		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
C1012	Same as C1005		
C1013	Capacitor, fixed, tantalum 15 uf, ± 10%	Fansteel PP15B15A2	2
C1014	Same as C1001		
C1015	Same as C1005		
C1016	Same as C1013		
C1017-	Capacitor, fixed, tantalum 10 uf, ± 10%	T301	1
Q1001	Transistor	2N334	3
Q1002	Transistor	2N334	
Q1003	Transistor	2N334	
Q1004	Transistor	2N43A	2
Q1005	Transistor	2N43A	

Note: Parts list for 1300 Unit is same as for 1000 Unit. Change first two digits of component identification number to 13.

Combining Unit, 1100 Unit

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R1101	Resistor, fixed, composition 20K, ± 5%, 1/4W	RC07GF203J	2
R1102	Resistor, fixed, composition 16K, ± 5%, 1/4W	RC07GF163J	5
R1103	Resistor, fixed, composition 4.7K, ± 5%, 1/4W	RC07GF472J	2
R1104	Same as R1102		
R1105	Resistor, fixed, composition 2K, ± 5%, 1/4W	RC07GF202J	3
R1106	Same as R1102		
R1107	Same as R1105		
R1108	Resistor, fixed, composition 8.2K, ± 5%, 1/4W	RC07GF822J	1
R1109	Resistor, fixed, composition 2K, ± 5%, 1/2W	RC20GF202J	1
R1110	Same as R1105		
R1111	Resistor, fixed, composition 10K, ± 5%, 1/4W	RC07GF103J	4
R1112 thru R1114	Same as R1111		
R1115	Resistor, fixed, composition 3K, ± 5%, 1/4W	RC07GF302J	3
R1116	Same as R1115		
R1117	Same as R1115		
R1118	Same as R1102		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R1119	Resistor, fixed, composition 3.3K, ± 5%, 1/4W	RC07GF332J	1
R1120	Not used		
R1121	Resistor, fixed, composition 1.5K, ± 5%, 1/4W	RC07GF152J	2
R1122	Same as R1121		
R1123	Same as R1103		
R1124	Same as R1102		
R1125	Same as R1101		
R1126	Resistor, fixed, composition 5.6K, ± 5%, 1/4W	RC07GF562J	5
R1127	Resistor, variable 5K, ± 20%, 1/2W	Allen-Bradley Type G	1
R1128	Resistor, variable 1K, ± 20%, 1/2W	Allen-Bradley Type G	1
R1129 thru R1132	Same as R1126		
R1133	Resistor, fixed, composition 470K, ± 5%, 1/4W	RC07GF474J	1
R1134	Resistor, fixed, composition 82K, ± 5%, 1/4W	RC07GF823J	1
R1135	Not used		
R1136	Resistor, fixed, composition 4.3K, ± 5%, 1/4W	RC07GF432J	1
R1137	Resistor, fixed, composition 1 meg, ± 5%, 1/4W	RC07GF105J	1
R1138	Resistor, fixed, composition 18K, ± 5%, 1/4W	RC07GF183J	1
R1139	Same as R1138		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
R1140	Resistor, fixed, composition 1K, ± 5%, 1/4W	RC07GF102J	1
R1141	Resistor, fixed, composition 680ohm, ± 5%, 1/4W	RC07GF681J	1
C1101	Capacitor, fixed, electrolitic .22 uf, ± 20%	Sprague Type 1500 224A0036A2	1
C1102 thru C1104	Not used		
C1105	Capacitor, fixed, mica	Arco-ElMenco DM-15-270	1
C1106	Not used		
C1107	Capacitor, fixed, ceramic .01 uf, ± 10%	Erie, Hi-K Body Style 811	1
C1108	Not used		
C1109	Not used		
C1110	Capacitor, fixed, tantalum 6.8 uf	Mallory Type TAM	1
C1111	Capacitor, fixed, tantalum 39 uf	Mallory Type TAM	2
C1112	Capacitor, fixed 20 uf	Sprague Type TE1157	1
C1113	Same as C1111		
C1114	Capacitor, fixed, tantalum 50 uf	Texas Inst. Type T304	2
C1115	Same as C1114		
Q1101	Transistor	2N43A	5
C1102	Same as Q1101		
Q1103	Same as Q1101		

Circuit Symbol	Description	MIL or Manufacturers Stock/Type No.	Number per Complete Assembly
Q1104	Same as Q1101		
Q1105	Transistor	2N334	3
Q1106	Same as Q1105		
Q1107	Same as Q1105		
Q1108	Same as Q1101		
Q1109	Transistor	2N1150	5
Q1110	Same as Q1109		
Q1111	Same as Q1109		
Q1112	Transistor	2N496	1
Q1113	Same as Q1109		
Q1114	Same as Q1109		
CR1101	Diode, Germainum	1N67	1
CR1102	Diode	1N659	2
CR1103	Same as CR1102		
CR1104	Diode, Zener	1N1775A	1
K1101	Relay	Potter Brumfield PW5L S 5K	1

Voltage Regulator, 1200 Unit

Circuit Symbol	Description	MIL or Manufacturer Stock/Type No.	Number per Complete Assembly
R1201	Resistor, fixed, wire wound 1 ohm, ± 10%, 1/2W	1RC BW 1/2	1
R1202	Resistor, fixed, composition 1.1K, ± 5%, 1/2W	RC20GF112J	3
R1203	Same as R1202		
R1204	Same as R1202		
R1205	Resistor, fixed, wire wound .1 ohm, 1/2W	[redacted]	1
R1206	Resistor, fixed, composition 3.3K, ± 5%, 1/2W	RC20GF332J	1
R1207	Resistor, fixed, composition 2.2K, ± 5%, 1/4W	RC20GF222J	1
R1208	Resistor, fixed, composition 5.1K, ± 5%, 1/2W	RC20GF512J	1
C1201	Capacitor, fixed, tantalum 50 uf, ± 20%	Texas Inst. T304	1
CR1201	Diode, Zener	1N755	1
Q1201	Transistor	2N301A	1
Q1202	Transistor	2N43A	1
Q1203	Transistor	2N169A	1
J1201	Connector	Amphenol 126-214	1

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